PROJECT SPECIFICATIONS

DALTON STATE COLLEGE
HVAC CONTROLS PROJECT

DATE: May 19, 2014

PREPARED FOR

DALTON STATE COLLEGE
DALTON, GEORGIA

PREPARED BY

Leppard Johnson & Associates, P.C.
100 Crescent Centre Parkway, Suite 750
Tucker, Georgia 30084

Telephone: 770-270-1588 **Fax: 770-270-9588**

Document Set # ____

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DESIGN-BID-BUILD
CONSTRUCTION CONTRACT

BETWEEN CONTRACTOR AND OWNER

TO BE USED WITH
BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA'S
DESIGN PROFESSIONAL (ARCHITECTURAL) CONTRACT

BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA

For the Use and Benefit of:

USING AGENCY

DALTON STATE COLLEGE

and

CONTRACTOR

INSERT CONTRACTOR NAME

PROJECT NO. **HVAC CONTROLS PROJECT**

INCLUDES:

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CONSTRUCTION CONTRACT

BETWEEN CONTRACTOR AND OWNER

THIS CONSTRUCTION CONTRACT ("Contract") made this _____ day of _____ , **2013** (the "Effective Date"), by and between _____, (hereinafter the "Contractor"), whose address is _____, (Contractor's Address) and the BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA (hereinafter the "Owner"), for the use and benefit **Dalton State College** (hereinafter the "Using Agency" or "Institution).

WITNESSETH, that the Contractor and the Owner, for the consideration set forth herein, the adequacy and sufficiency of which is hereby acknowledged by each party, agree as follows:

Project No.

Project Name and Description: HVAC Controls Project (hereinafter the "Project.")

1. Existing Documents. The Contractor has reviewed and taken into consideration the Bidding Documents in preparing his bid.

2. The Contract Sum: The Owner shall pay the Contractor for the performance of the contract, subject to additions and deductions provided by approved change orders, in current funds, the Contract Sum as follows:

_____ Dollars ($_____)

3. The Material Completion and Occupancy Date shall be achieved within _____ consecutive calendar days beginning the date specified in the Proceed Order.

4. **The agreed daily amount for Liquidated Damages is:** **$** N/A per day.

5. **The agreed daily amount for Time Dependent Overhead Costs is:** $ N/A per day.

6. Notice. All notices in accordance with Section 1.1.5 shall be given to the following addresses:

CONTRACTOR:

Contractor Name
Contractor Address Line 1
Contractor Address Line 2
Attention: Contractor POC for Project
Phone Number: Contractor Phone
Facsimile Number: Contractor Fax

OWNER:

Board of Regents of the University System of Georgia
270 Washington Street, SW, 6th Floor
Atlanta, Georgia 30334
Attention: Linda M. Daniels, Vice Chancellor for Facilities
Phone Number: 404-656-2243
Facsimile Number: 404-657-7433

OWNER'S REPRESENTATIVE:

Dalton State College
Mr. Scott Bailey
On behalf of
Board of Regents of the University System of Georgia
270 Washington Street, SW, 6th Floor
Atlanta, Georgia 30334
Attention:
Phone Number:
Facsimile Number:

USING AGENCY (Institution):

Dalton State College
650 College Drive
Dalton, GA 30720
Attention: Mr. Scott Bailey
Phone Number: 706-272-4480
Facsimile Number: 706-272-4588

DESIGN PROFESSIONAL:

Leppard Johnson & Associates, P.C.
100 Crescent Centre Parkway
Suite 700
Tucker, GA 30084
Attention: Ben A. Leppard, Jr., P.E.
Phone Number: 770-270-1588
Facsimile Number: 770-270-9588

7. Scope Of The Work: The Contractor shall furnish all the materials, perform all of the Work, and do all things required by the Contract Documents.

8. Schedule and Completion: The Pre-commencement Phase Services to be performed under this Contract shall commence upon the Effective Date of the Contract and be completed within 60 days thereafter. Activities on the Site shall commence on the date specified in the Proceed Order and shall be materially complete in accordance with established Milestones, and not later than the Material Completion and Occupancy Date.

9. Periodic Progress Payments: The Owner shall make progress payments, less retainage, as set forth in Section 4 of the General Conditions.

10. Payment for Material Completion: The Contractor may request payment of the remaining contract balance, including retainage, less amounts credited the Owner or incurred as liquidated damages, and less amounts withheld for the Punchlist by reason of Minor Items or Permitted Incomplete Work (See Paragraph 6.5.3.2). Payment for Material Completion shall be made by a check payable jointly to the Contractor and Surety and shall be mailed to the Surety.

11. Final Payment: Final Payment shall be made within ten days of receipt of the final payment application as set forth in Section 6, Part 2 of the General Conditions, provided that all other requirements of the Contract shall have been met in full.

12. **The Contract Documents**: **This Contract, together with the Bidding Documents and the Bid, shall constitute the Contract Documents for the Project.**

13. Bonds: The Contractor shall furnish both a performance bond and a payment bond and shall pay the premiums thereon as a Cost of the Work. The Performance Bond shall guarantee the full performance of the Contract.

14. Full Performance: The Owner and the Contractor hereby agree to the full performance of the Contract Documents.

15. Applicable Law: This Contract and all rights, privileges and responsibilities shall be interpreted and construed according to the laws of the State of Georgia.

16. No Conflict Of Interest: The Contractor covenants that it presently has no interest and shall not acquire any interest, direct or indirect, that would conflict in any manner or degree with the performance required under this Contract. The Contractor further covenants that, in the performance of this Contract, it shall neither contract with nor employ any person having any such interest.

17. Transactions With State Officials, Ethics: The parties hereto certify that the provisions of law contained in the Act prohibiting full-time appointive officials and employees of the State from engaging in certain transactions affecting the State as defined in O.C.G.A. §§45-10-20–26 and the Governor's Executive Orders governing ethics, have not and will not be violated in any respect in regard to this contract and further certifies that registration and all disclosures required thereby have been complied with.

18. No Assignment: This Contract and the proceeds of this Contract may not be assigned or sublet as a whole, nor may the performance thereunder be assigned, without the prior written consent of the Owner.

19. No Waiver: The failure of the Owner at any time to require performance by the Contractor of any provision hereof, shall in no way affect the right of the Owner thereafter to enforce any provision or any part of the Contract, nor shall the failure of the Owner to enforce any breach of any provision hereof to be taken or held to be a waiver of such provision, or as a waiver, modification or rescission of the Contract itself.

20. Full Agreement. The Contract Documents supersede all prior negotiations, discussion, statements, and agreements between Owner and Contractor and constitute the full, complete, and entire agreement between Owner and Contractor. There can be no changes to this Contract by oral means, nor by course of conduct of the parties, nor by custom of the trade. No changes to this Contract will be binding on either party hereto unless such change is properly authorized, in writing, in accordance with Section 3, Part 2 of the General Conditions.

IN WITNESS WHEREOF the parties hereto have executed this Contract the day and year first written above.

_____
(Contractor)

ATTEST:

_____ (L.S.) By: _____ (L.S.)

_____, Secretary _____, President
(Print Name) (Print Name)
(SEAL Over Signature)

APPROVED: USING AGENCY

BY: _____
Dr. John Schwenn, PRESIDENT
DALTON STATE COLLEGE

WITNESS: _____

_____
PRINT NAME / TITLE

BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA, OWNER

BY: _____ (L.S.)
MR. SCOTT BAILEY
VICE PRESIDENT FOR FISCAL AFFAIRS

WITNESS: _____
SHEREE WILDER SRADER
DIRECTOR OF CONTRACTS & SERVICES

BID REQUIREMENTS

INVITATION TO BID

The Owner will receive sealed bids from Contractors in Room # 170, Westcott Building, Dalton State College. Bids must be physically on the table in the Bid Room by 2 o'clock pm, at the time legally prevailing in Dalton, Georgia on June 25, 2014 at 10:00AM for the construction of HVAC Controls Project*,* located at Dalton State College, in Dalton, Georgia. At the time and place noted above, the bids will be publicly opened and announced.

Bidding Documents may be obtained through the Georgia Procurement Registry under Bid Documents. Hard copies may be obtained at the office of the Design Professional, Leppard Johnson and Associates, P.C.*,* Phone: 770/270-1588*.* Applications for hard copies of the documents, together with non-refundable deposit of $ 100 per set, should be filed promptly with the Design Professional.

Bidders are cautioned that acquisition of Bidding Documents through any source other than the office of the Design Professional is not advisable. Acquisition of Bidding Documents from unauthorized sources places the bidder at risk of receiving incomplete or inaccurate information upon which to base a bid.

There will be a *pre-bid* conference held on June 5, 2014, at 9:00 AM in Room 170, Westcott Building at Dalton State College. Attendance at this conference is **MANDATORY** for any Contractor intending to bid on this project. Others may attend if they so desire.

The Design Professional will send the Bidding Documents, shipping charges collect, as soon as possible after receipt of application and deposit.

Contract, if awarded, will be on a lump sum basis. No bid may be withdrawn for a period of thirty-five days after time has been called on the date of opening except in accordance with the provisions of Georgia law. Bids must be accompanied by a Bid Bond made payable to the Owner in an amount equal to not less than five percent of the Bid. Both a performance bond and a payment bond will be required, each in an amount equal to 100 percent of the Contract Sum prior to execution of contract.

The Owner reserves the right in its sole and complete discretion to waive technicalities and informalities. The Owner further reserves the rights in its sole and complete discretion to reject all bids and any bid that is not responsive or that is over the budget. The Owner anticipates that the contract will be awarded to the responsive and responsible bidder who provides the lowest bid within the budget. In judging whether the bidder is responsible, the Owner will consider, but is not limited to, the following:

- Whether the bidder or its principals are currently ineligible, debarred, suspended, or otherwise excluded from bidding or contracting by any state or federal agency, department, or authority;
- Whether the bidder or its principals have been terminated for cause or are currently in default on a public works contract;
- Whether the bidder can demonstrate sufficient cash flow to undertake the project as evidenced by a Current Ratio of 1.0 or higher;
- Whether the bidder can demonstrate a commitment to safety with regard to Workers' Compensation by having an Experience Modification Rate (EMR) over the past three years not having exceeded an average of 1.2; and
- Whether the bidder's past work provides evidence of an ability to successfully complete public works projects within the established time, quality, or cost, or to comply with the bidder's contract obligations.

In the event all responsive and responsible bids are in excess of the budget, the Owner, in its sole and absolute discretion and in addition to rejecting all bids, reserves the right either to supplement the budget or to negotiate with the lowest responsive and responsible bidder (after all deductive alternates are taken) but only for the purpose of making changes to the project that will result in a cost to the Owner that is within the budget, as it may be supplemented.

BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA

BY: DR. ERROLL B. DAVIS, CHANCELLOR

BID REQUIREMENTS

INSTRUCTIONS TO BIDDERS

1. **Basis of Contract.** Contract, if awarded, will be on a lump sum basis and will be substantially in accordance with the Contract shown on pages Contract – 1 to Contract – 3.

2. **Examination of Site.** In undertaking the work under this Contract, the Contractor acknowledges that he has visited the Project Site and has taken into consideration all observed conditions that might affect his work.

3. **Surety and Insurance Companies.** The Contract provides that the surety and insurance companies must be acceptable to the Owner. Only those sureties listed in the Department of Treasury's Listing of Approved Sureties (Department Circular 570) are acceptable to the Owner. At the time of issuance, all insurance and bonds must be issued by a company licensed by the Georgia Insurance Commissioner to transact the business of insurance in the State of Georgia for the applicable line of insurance. Such company shall be an insurer (or, for qualified self insurers or group self insureds, a specific excess insurer providing statutory limits) with an A.M. Best Financial Strength Rating of "A-" or better and with an A.M. Best Financial Size Category of Class V or larger.

4. **Bidding Documents.** The Bidding Documents comprise the Construction Documents, the Invitation to Bid, the Instructions to Bidders, the Bid Form, and all Addenda, upon which the bidder submits a bid.

5. **Addenda.** All Addenda issued prior to bid date adjust, modify, or change the drawings and specifications as set forth in the Addenda. No Addenda will be issued within five days of the date set for opening bids without an extension of the bid date. All such Addenda are part of the contract.

6. **Interpretations.** No oral interpretation will be made to bidders as to the meaning of the drawings and specifications. Requests for interpretation of drawings and specifications must be made in writing to the Design Professional not later than six days prior to the date set for receipt of the bids. Failure on the part of the successful bidder to request clarification shall not relieve him as Contractor of the obligation to execute such work in accordance with a later interpretation by the Design Professional. All interpretations made to bidders will be issued in the form of Addenda to the plans and specifications and will be sent to all plan holders of record. Acknowledgement of receipt of such Addenda shall be listed in the Bid Form by the Contractor.

7. **Alternates.** Unless otherwise stipulated, all alternate bids are deductive. It is in the best interest of the public, and the intent of the Owner is, that the entire Project be constructed within the funds allocated in the Project budget. The acceptance of any deductive alternate will be utilized as a last resort to accomplish the Project without requiring a redesign and rebidding of the Project. Any alternate, or alternates, if taken, will be taken in numerical sequence to the extent necessary.

8. **Sales Tax.** Unless otherwise provided for in the Contract Documents, the Contractor shall include in his bid all sales taxes, consumer taxes, use taxes, and all other applicable taxes that are legally in effect at the time bids are received.

9. **Trade Names, Specifications.**

(a) *No Restriction of Competition.* When reference is made in the Contract Documents to trade names, brand names, or to the names of manufacturers, such references are made solely to indicate that products of that description may be furnished and are not intended to restrict competitive bidding. If it is desired to use products of trade or brand names or of manufacturers' names that are different from those mentioned in the Bidding Documents, application for the approval of the use of such products must reach the hands of the Design Professional at least ten days prior to the date set for the opening of bids (*see* 9(b) below). This provision applies only to the party making a submittal prior to bid. If approved by Design Professional, the Design Professional will issue an addendum to all bidders. This provision does not prevent the Owner from initiating the addition of trade names, brand names, or names of manufacturers by addendum prior to bid.

(b) *Request for Approval of Substitute Product*. All requests for approval of substitution of a product that is not listed in the Bidding Documents must be made to the Design Professional in writing. For the Design Professional to prepare an addendum properly, an application for approval of a substitute product must be accompanied by a copy of the published recommendations of the manufacturer for the installation of the product together with a complete schedule of changes in the drawings and specifications, if any, that must be made in other work in order to permit the use and installation of the proposed product in accordance with the recommendations of the manufacturer of the product. The application to the Design Professional for approval of a proposed substitute product must be

accompanied by a schedule setting forth in which respects the materials or equipment submitted for consideration differ from the materials or equipment designated in the Bidding Documents.

(c) *Burden of Proof.* The burden of proving acceptability of a proposed product rests on the party making the submission. Therefore, the application for approval must be accompanied by technical data that the party requesting approval desires to submit in support of its application. The Design Professional will consider reports from reputable independent testing laboratories, verified experience records showing the reputation of the proposed product with previous users, evidence of reputation of the manufacturer for prompt delivery, evidence of reputation of the manufacturer for efficiency in servicing its products, or any other written information that is helpful in the circumstances. The degree of proof required for approval of a proposed product as acceptable for use in place of a named product or named products is that amount of proof necessary to convince a reasonable person beyond all doubt. To be approved, a proposed product must also meet or exceed all express requirements of the Contract Documents.

(d) *Issuance of Addenda.* If the Design Professional approves the submittal, an addendum will be issued to all prospective bidders indicating the approval of the additional product(s). Issuance of an addendum is a representation to all bidders that the Design Professional in the exercise of his professional discretion established that the product submitted for approval is acceptable and meets or exceeds all express requirements. If a submittal is initially rejected by the Design Professional, but determined to be acceptable to Design Professional after a conference with the Owner, an addendum covering the said submittal will be issued prior to the opening of bids. The successful bidder may furnish no products of any trade names, brand names, or manufacturers' names except those designated in the Contract Documents unless approvals have been published by addendum in accordance with the above procedure. Oral approvals of products are not valid.

(e) *Conference with the Owner*. Any party who alleges that rejection of a submittal is the result of bias, prejudice, caprice, or error on the part of the Design Professional may request a conference with a representative of the Owner, provided: that the request for said conference, submitted in writing, shall have reached the Owner at least six days prior to the date set for the opening of bids, time being of the essence.

10. **Employment of Georgia Citizens and Use of Georgia Products.** The work provided for in this Contract is to be performed in Georgia. It is the desire of the Owner that materials and equipment manufactured or produced in Georgia shall be used in the work and that Georgia citizens shall be employed in the work at wages consistent with those being paid in the general area in which the work is to be performed. This desire on the part of the Owner is not intended to restrict or limit competitive bidding or to increase the cost of the work; nor shall the fulfillment of this desire be asserted by the Contractor as an excuse for any noncompliance or omission to fulfill any obligation under the contract.

11. **Trading with the State Statutes, Ethics.** By submitting a bid, the bidder certifies that the provisions of law contained in O.C.G.A. Sections 45-10-20 to 45-10-71, which prohibit officials and employees of the state from engaging in certain transactions with the state and state agencies, and the Governor's Executive Orders governing ethics, have not and will not be violated in any respect in regard to this contract and further certifies that registration and all disclosures required thereby have been complied with.

12. **Owner's Policy Statement.** The policy of the Owner is that minority business enterprises shall have the maximum opportunity to participate in the Owner's purchasing process. The Owner encourages all minority business enterprises to compete for, win, and receive contracts for goods, services, and construction. In addition, Georgia law provides a state income tax credit available to any business that subcontracts with a minority-owned business. [*See* O.C.G.A. §48-7-38 and O.C.G.A. §50-5-130. *See also* Executive Order of the Governor No. A-11-0002-1992.] For more information, please contact the Board of Regents' Office of Business Development by e-mail at BusinessDevelopment@usg.edu. Any questions regarding statements contained hereunder should be directed to {Name, Address, and Telephone Number of Designee, as described in the box below}.

13. **Bids.**

(a) *Bid Opening.* Bids will be opened and announced as stated in the Invitation to Bid.

(b) *Bid Submission.* All bids must be submitted on the Bid Form as attached hereto and must be signed, notarized, and sealed by a notary public. All blanks for information entry in bid forms submitted to Owner should be filled. Blanks left unfilled constitute irregularities in the bid and place the bidder at risk of having the bid rejected *unless* the Owner rules the irregularity to be an informality or technicality that the director can waive, as is made clear in Article 15 of the "Instructions to Bidders" and on the Bid Form. Numbers shall be written in English words and in Arabic numerals. The inclusion of any condition, alternate, qualification, limitation, or provision not called for shall render the bid nonresponsive and shall be sufficient cause for rejection of a bid.

(c) *Bid Security.* Bids must be accompanied by a Bid Bond made payable to the Owner in an amount not less than five percent of the Bid. Bid Bonds should be furnished on forms accepted as standard by the insurance industry, but shall be substantially in accordance with the Bid Security Form attached hereto.

(d) *Delivery of Bids.* Bids are to be addressed to the Owner, at the address and room number shown in the Invitation to Bid. Bids must be enclosed in an opaque, sealed envelope; marked with the Bid Date, Bid Time, Bid Number, Name of Project; and identified with the words "Bid for Construction." Bids must be placed in the hands of the Owner at the specified location by not later than the hour and date named in the Invitation to Bid. After that time, no bids may be received.

(e) Alternates*.* A bid must be submitted for all alternates. Failure to so may render the bid nonresponsive and be sufficient cause for rejection of a bid.

(f) *Withdrawal of Bids.* Bids may be withdrawn by bidders prior to the time set for official opening. After time has been called, no bid may be withdrawn for a period of thirty-five days after the time and date of opening except as provided in O.C.G.A Section 13-10-22 (appreciable error in calculation of bid). Negligence or error on the part of any bidder in preparing his bid confers no right of withdrawal or modification of his bid after time has been called except as provided by Georgia law.

14. **Contract Award.** Award shall be made on a lump sum basis to the lowest responsive and responsible bidder. The lowest bid will be the bid whose price, after incorporating all accepted alternates, is the lowest responsive bid that was received from a responsible bidder. No bid may be withdrawn for a period of thirty-five days after time has been called on the date of opening except in accordance with the provisions of law.

15. **Owner's Rights Concerning Award.** The Owner reserves the right in its sole and complete discretion to waive technicalities and informalities. The Owner further reserves the right in its sole and complete discretion to reject all bids and any bid that is not responsive or that is over the budget, as amended. In judging whether the bidder is responsible, the Owner will consider, but is not limited to consideration of, the following:

(a) Whether the bidder or its principals are currently ineligible, debarred, suspended, or otherwise excluded from bidding or contracting by any state or federal agency, department, or authority;

(b) Whether the bidder or its principals have been terminated for cause or are currently in default on a public works contract;

(c) Whether the bidder can demonstrate sufficient cash flow to undertake the project as evidenced by a Current Ratio of 1.0 or higher;

(d) Whether the bidder can demonstrate a commitment to safety with regard to Workers' Compensation by having an Experience Modification Rate (EMR) over the past three years not having exceeded an average of 1.2; and

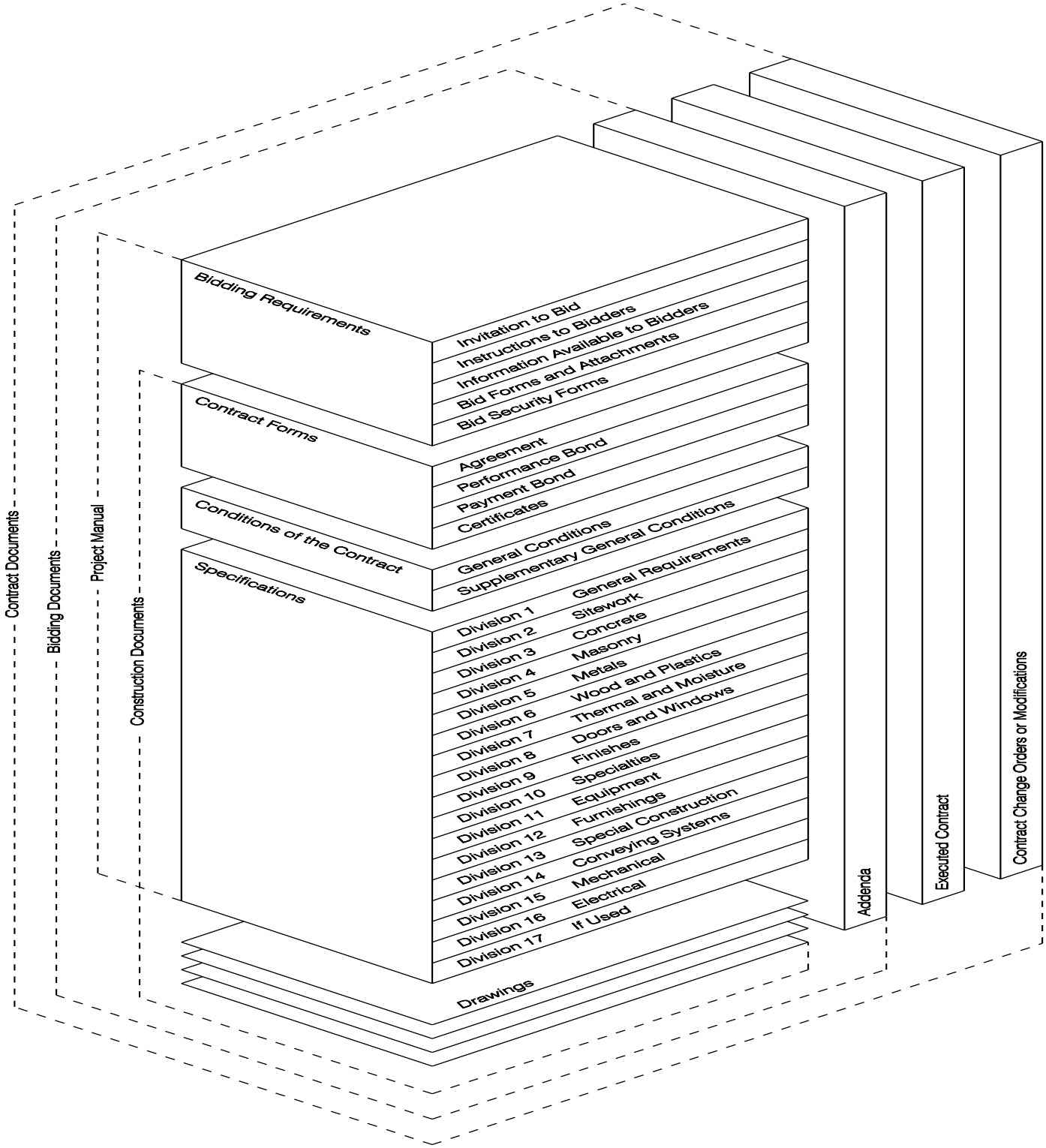
(e) Whether the bidder's past work provides evidence of an ability to successfully complete public works projects within the established time, quality, or cost, or to comply with the bidder's contract obligations.

16. **Owner's Right to Negotiate with the Lowest Bidder.** In the event *all* responsive and responsible bids are in excess of the budget, the Owner, in its sole and absolute discretion and in addition to the rights set forth above, reserves the right either to (i) supplement the budget with additional funds to permit award to the lowest responsive and responsible bid, or (ii) to negotiate with the lowest responsive and responsible bidder (after taking all deductive alternates) only for the purpose of making changes to the Project that will result in a cost to the Owner that is within the budget, as it may be amended.

17. **Contract Forms.** The contract forms, including the payment and performance bonds, shall be as set forth in the General Conditions, Section 7 – Forms.

[Remainder of Page Intentionally Left Blank]

Organization and Classification of Contract Documents



BID REQUIREMENTS

BID FORM

To: OWNER **Dalton State College on behalf of Board of Regents of the University System of Georgia 270 Washington St., SW, 6th. Floor, Atlanta, Georgia 30334 Attn: Linda M. Daniels, Vice Chancellor for Facilities..**

Re: Project Name and No. **HVAC Controls Project**

Bid Date: _____

THE BID:

Bid. Having carefully examined the Specifications entitled PROJECT NO. {DESIGN PROFESSIONAL insert Project name and number}, and the Bidding Documents and Addendum (a) No.(s) A1, _____, as well as the Site and conditions affecting the Work, bidder hereby proposes to furnish all services, labor, materials, and equipment called for by them for the entire Work, in accordance with the aforesaid documents, for the sum of:

_____ Dollars ($ _____)

which sum is hereinafter called the Bid. The Bid shall be the amount of the Contract Sum executed between the Owner and the Contractor unless Alternates are accepted.

Unit Prices. The following unit prices are proposed and valid throughout the term of this Contract:

_____ Dollars ($ _____), each.

Alternates. We further propose that, should any of the following alternates be accepted and be incorporated in the Contract, the Bid will be altered in each case as follows:

Alternate No. 1 –

Errors or Revisions. Prior to the bid opening date and hour, errors may be stricken or revisions may be made and corrections entered on this proposal form or on the bid envelope with sufficient clarity to be easily understood. All such annotations shall be binding on the bidder.

No Withdrawal. For and in consideration of the sum of $10.00, the receipt of which is hereby acknowledged, bidder and Owner agree that this bid may not be revoked or withdrawn after the time set for the opening of bids, except as provided in Georgia law, but is an irrevocable offer that shall remain open for acceptance for a period of thirty-five days following the time set for the opening of bids.

Execution of the Contract. If bidder is notified in writing by statutory mail of the acceptance of this bid within thirty-five days after time set for the opening of bids, bidder agrees to execute within ten days the Contract for the Work for the above stated Bid, as adjusted by the accepted Alternates, and at the same time to furnish and deliver to the Owner a Performance Bond and a Payment Bond on forms shown in Section 7 of the General Conditions of the Contract, both in an amount of equal to 100 percent of the Contract Sum.

Commencement and Completion of Work. Upon the Effective Date of the Contract, bidder agrees to commence all Preconstruction Activities. Upon issuance of a Proceed Order, bidder agrees to commence physical activities on the Site with adequate forces and equipment and to complete to Material Completion all work in _____consecutive calendar days beginning the day after the date of the Proceed Order.

Bid Bond. Enclosed herewith is a Bid Bond *(NO OTHER FORM ACCEPTABLE)* in the amount of _____ Dollars ($ _____) (being not less than five percent of the Bid). Bidder agrees that the above stated amount is the proper measure of liquidated damages that the Owner will sustain by bidder's failure to execute the Contract or to furnish the Performance and Payment Bonds should bidder's bid be accepted.

Obligation of Bid Bond. If this bid is accepted within thirty-five days after the date set for the opening of bids and bidder fails to execute the Contract within ten days after Notice of Successful Bid, or if bidder fails to furnish both Performance and Payment Bonds, the obligation of the Bid Bond will remain in full force and effect and the money payable thereon shall be paid into the funds of the Owner as liquidated damages for such failure; otherwise, the obligations of the Bid Bond will be null and void.

Bidder Certification

Certification under Oath. Under oath I certify that I am a principal or other representative of the bidder, and that I am authorized by it to execute the foregoing bid on its behalf; and further, that I am a principal person of the bidder with management responsibility for the construction for the bidder, and as such I am personally knowledgeable of all its pertinent matters. I further certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, or person submitting a bid for the same services, materials, labor, supplies, or equipment and is in all respects fair and without collusion or fraud. Bidder and its principals understand that collusive bidding is a violation of state and federal law and can result in fines, prison sentences, and civil damage awards. Bidder agrees to abide by all conditions of this bid.

BY: _____
Authorized *Signature* *(BLUE INK PLEASE)*

_____
Printed Name Title

Sworn to and subscribed before me this ____ Day of _____ , 20_____.

_____
Notary Public

My commission expires: _____

(SEAL)

NOTE: THE NOTARY SEAL MUST BE APPLIED UNDER GEORGIA LAW, WHETHER OR NOT THE LAW OF THE STATE WHERE EXECUTED PERMITS OTHERWISE.

STATEMENT OF BIDDER'S QUALIFICATIONS:
(To be subscribed and sworn to before a notary public.)

The bidder submits the following statement of bidder's qualifications for consideration by the Owner.

Bidder's Name: _____
LEGAL NAME OF BUSINESS

Bidder's Address: _____
LEGAL BUSINESS ADDRESS (P.O. BOX IS INSUFFICIENT)

_____
CITY STATE ZIP

_____
MAILING ADDRESS IF DIFFERENT FROM ABOVE

Telephone Number: _____ _____
AREA CODE NUMBER

The full names of persons and firms interested in the foregoing bid as principals are as follows:

(1)_____
Circle One: President Partner Owner Other

(2)_____
Circle One: Vice President Secretary Partner Other

(3)_____
Circle One: Vice President Secretary Partner Other

Note: *If incorporated: The names of both the President and Corporate Secretary must be indicated. If a partnership, all partners must be indicated.*

Social Security Number or **FEIN:** _____

State Where Organized or Incorporated: _____

Plan of Organization: (Circle One) Proprietorship Corporation Partnership Joint Venture Other (Describe)

Years Engaged in Construction Contracting in Present Firm Organization: _____ years.

Bidder Hereby Certifies that bidder:

a. Has never refused to sign a contract at the original bid on a public works contract except as allowed under Georgia law.

b. Has never been terminated for cause on a public works contract.

c. Has had no (criminal or felony) convictions, suspensions, or debarments of the bidder, its officers, or its principals for building code violations, bid rigging, or bribery in the last ten years.

d. Is not and its organization or its principals are not debarred, suspended, declared ineligible, or otherwise excluded by any Federal or State department or agency from doing business with the Federal Government or a State.

e. Has insurance required by the Contract Documents in place or has arranged to obtain it from an insurer authorized to do business in the State of Georgia.

f. Has sufficient bonding capacity to obtain a payment and performance bond from a surety meeting the requirements of the Contract Documents and authorized to do business in the State of Georgia.

g. Has sufficient cash flow to perform this Project.

Remarks or explanations of the above paragraphs a through g:

_____

_____

_____

_____

Bidder Certification

Certification under Oath. Under oath I certify that I am a principal or other representative of the bidder, and that I am authorized by it to execute the foregoing Statement of Bidder's Qualifications is true and correct, including any explanation above and submitted under oath.

BY: _____
Authorized *Signature* *(BLUE INK PLEASE)*

_____
Printed Name Title

Sworn to and subscribed before me this ____ Day of _____ , 20_____.

_____
Notary Public

My commission expires: _____

(SEAL)

NOTE: THE NOTARY SEAL MUST BE APPLIED UNDER GEORGIA LAW, WHETHER OR NOT THE LAW OF THE STATE WHERE EXECUTED PERMITS OTHERWISE.

Statistical Information. This request is made for statistical purposes only.

PLEASE INDICATE BELOW WHICH OF THE FOLLOWING DESCRIPTIONS APPLY TO YOUR COMPANY:

____ MINORITY BUSINESS ENTERPRISE (MBE) – One of the following statements describes this business: **a)** Owned by a member of a minority race; or **b)** a partnership of which a majority of interest is owned by one or more members of a minority race; or **c)** a public corporation of which a majority of the common stock is owned by one or more members of a minority race. A member of a minority race is defined as a person who is a member of a race that comprises less than fifty percent of the total population of the State of Georgia. For recordkeeping purposes, this includes, but is not limited to, persons who are Black, Hispanic, Asian-Pacific American, Native American, or Asian-Indian American.

____ GEORGIA MINORITY BUSINESS ENTERPRISE (GMBE) – Business meets the definition of a minority-owned business and, in addition, meets the following criteria: **a)** was organized in the State of Georgia; or **b)** reports income from the business for Georgia Income Tax purposes; or **c)** minority stockholders report earnings for Georgia Minority Business Enterprise. For more information, please contact the Board of Regents' Office of Business Development by e-mail at BusinessDevelopment@usg.edu.

____ NEITHER DESCRIPTION APPLIES TO YOUR COMPANY.

BID REQUIREMENTS
BID SECURITY FORM

NOTE TO CONTRACTOR: Use of Surety's standard Bid Bond form is acceptable as long as it substantially complies with the following:

KNOW ALL BY THESE PRESENTS, That we, {Insert Contractor's Legal Name and Address} as Principal, hereinafter called the Principal, and {Insert Legal Name and Address of Surety}, a corporation duly organized under the laws of the State of {Insert State of Corporate Organization}, as Surety, hereinafter called the Surety, are held and firmly bound unto:

OWNER: _____

Attention: _____

Phone Number: _____

Facsimile Number: _____

as Obligee, hereinafter called the Obligee in the sum of _____ (Not less than five percent of the Bid) Dollars ($ _____), for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a Bid for _____;
{Insert Owner's Project Number and Project Description}

NOW, THEREFORE, if the Obligee shall accept the Bid of the Principal and (1) the Principal shall enter into a Contract with the Obligee in accordance with the terms of such Bid, and the Principal shall execute the Contract and give such bond or bonds as may be specified in the Bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) in the event of the failure of the Principal to enter such Contract and give such bond or bonds, and the Principal shall pay to the Obligee the difference not to exceed the difference hereof between the amount specified in said Bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said Bid; then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this _____ Day of _____, 20___

Name of Contractor: _____
Principal

_____
Witness

By: _____ (Seal)

_____
Title

Name of Surety: _____
Surety

_____
Witness

By: _____ (Seal) (*)

(*) Attach Power of Attorney

SECTION 7 – FORMS

FORMS INDEX:

Performance Bond
Payment Bond
Contractor Affidavit and Certificate of Compliance
Subcontractor Affidavit and Certificate of Compliance
Non-Influence Affidavit
Statutory Affidavit
Five Year Bond on Roofs and Walls
Specimen Certificate of Manufacturer
Certificate of Insurance
Bond to Discharge Claim
Change Order Form
Application for Payment Form
Subcontractor Retainage Release Certificate
Final Certification of Costs

PERFORMANCE BOND

Bond No. _____

Project No. _____

KNOW ALL MEN BY THESE PRESENTS:

That _____ as principal (hereinafter referred to
(Legal Name and Address of the Contractor)
as "Contractor"), and _____ as surety (hereinafter referred to
(Legal Title and Address of Surety)
as "Surety"), are held and firmly bound unto the Board of Regents of the University System of Georgia as Obligee (hereinafter referred to as "Owner") in the amount of _____ _____ DOLLARS ($_____), to which payment Contractor and Surety bind Themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above bounden Principal has entered into a contract with the Owner bearing date of _____for:_____
(Insert Name of Work)
in accordance with drawings and specifications prepared by: _____ which
(Full Name and Title)
said contract is incorporated herein by reference and made a part hereof, and is hereinafter referred to as the Contract.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Contractor shall promptly and faithfully perform and comply with the terms and conditions of said contract; and shall indemnify and save harmless the Owner against and from all cost, expenses, damages, injury or loss to which said Owner may be subjected by reason of any wrongdoing, including patent infringement, misconduct, want of care or skill, default or failure of performance on the part of said Principal, his agents, subcontractors or employees, in the execution or performance of said contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

(1) The said Surety to this bond, for value received, hereby stipulates and agrees that no change or changes, extension of time or extensions of time, alteration or alterations or addition or additions to the terms of the contract, or to the work to be performed thereunder, or the specifications or drawings accompanying same, or the exercise of the Owner's right to do work pursuant to Articles 1.3.7, 1.7.8, or 5.3.5, or Paragraphs 3.4.1.4 or 5.3.2.3, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change or changes, extension of time or extensions of time, alteration or alterations or addition or additions to the terms of the contract or to the Work or to the specifications or drawings. In addition, the Surety to this bond, for value received, hereby agrees to the provisions of Article 1.5.1, including Paragraph 1.5.1.3 for increases in the penal amount of this bond, and waives notice from the Owner of any such changes.

(2) If pursuant to the Contract Documents the Contractor shall be declared in default by the Owner under the aforesaid Contract and the Owner has terminated the Contractor's right to complete the Contract, the Surety shall promptly perform this bond agreement in accordance with its terms and conditions. If Surety chooses to investigate, Owner shall cooperate with the Surety in its investigation and shall make all public project records available for inspection by Surety at no cost to Owner. It shall be the duty of the Surety to give an unequivocal notice in writing to the Owner, within twenty-five (25) days after receipt of such a declaration of default, of the Surety's election to either remedy the default or defaults promptly or to perform the Contract promptly, time being of the essence. In said notice of election, the Surety shall indicate the date on which the remedy or performance will commence, and it shall then be the duty of the Surety to give prompt notice in writing to the Owner immediately upon completion of (a) the remedy and/or correction of each default, (b) the remedy and/or correction or each item of condemned work, (c) the furnishing of each omitted item of work, and (d) the performance of the contract. The Surety shall not assert its Principal as justification for its failure to give notice of election or for its failure to promptly remedy the default or defaults or perform the Contract.

(3) It is expressly agreed by the Principal and the Surety that the Owner, if he desires to do so, is at liberty to make inquiries at any time of subcontractors, laborers, materialmen, or other parties concerning the status of payments for labor, materials, or services furnished in the prosecution of the work.

(4) No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the legal successors of the Owner.

(5) For the purposes of this bond, the name and address of the **responsible official of the Surety's claims department**, to whom correspondence and telecommunications may be addressed and/or with whom business concerning this bond may be conducted will be as follows:

NAME _____

TITLE _____

ADDRESS _____

CITY_____ STATE _____ ZIP CODE _____

TELEPHONE _____

(6) Further, this bond shall be the Performance Bond furnished under O.C.G.A. §§ 13-10-2, 13-10-20 and shall be subject to increase in the penal amount of the bond pursuant to such statutes and Article 1.5.1 of the Contract.

(7) No action can be instituted on this bond after one year from the date of Final Completion as determined pursuant to Article 6.2.2.

SIGNED AND SEALED THIS _____ DAY OF _____, 20_____.

ATTEST: (NAME OF Contractor)

_____ By_____
Secretary(*) President

_____
(SURETY) (*)(*)

_____
(TITLE)

(*) Please apply seal of Corporation over Secretary's Signature.
(*)(*) Please apply seal of Surety and arrange for countersignature by a "Georgia Licensed Agent" of Surety pursuant to O.C.G.A. §33-23-5. Kindly show title of the aforesaid agent as "Georgia Licensed Agent."

(*) Attach Power of Attorney

PAYMENT BOND

Bond No. _____

Project No. _____

KNOW ALL MEN BY THESE PRESENTS:

That_____ as Principal (hereinafter referred to as the
(Legal Title and Address of the Contractor)

"Principal") and _____ as Surety (hereinafter referred
(Legal Name and Address of the Surety)

to as "Surety"), are held and firmly bound unto the BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA as Obligee (hereinafter referred to as "Owner") for the use and benefit of claimants defined, hereinafter in the amount of:_____ DOLLARS ($_____)
(Insert Contract Price)

to which payment Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns jointly and severally, firmly by these presents.

WHEREAS, the above bounden Principal has entered into a contract with Owner dated _____ for _____ in accordance with the drawings and
(Insert Name of Work)

specifications prepared by: _____ which contract is incorporated herein
(Here insert Full Name and Title)

by reference and made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and materials supplied in the prosecution of the work provided for in said Contract, then this obligation shall be void, otherwise it shall remain in full force and effect subject, however, to the following conditions:

(1) The said Surety to this bond, for value received, hereby stipulates and agrees that no change or changes, extension of time or extensions of time, alteration or alterations or addition or additions to the terms of the contract or to the work to be performed thereunder, or the specifications or drawings accompanying same, or the exercise of the Owner's right to do work pursuant to Articles 1.3.7,1.7.8 or 5.3.5 or Paragraphs 3.4.1.4 or 5.3.2.3, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change or changes, extension of time or extensions of time, alteration or alterations or addition or additions to the terms of the contract or to the Work or to the specifications or drawings. In addition, the Surety to this bond, for value received, hereby agrees to the provisions of Article 1.5.1, including Paragraph 1.5.1.3, for increases in the penal amount of this bond and waives notice from the Owner of any such changes.

(2) A claimant is defined as any subcontractor and any person supplying labor, materials, machinery, or equipment in the prosecution of the work provided for in said contract.

(3) Every person entitled to the protection hereunder and who has not been paid in full for labor or materials furnished in the prosecution of the work referred to in said bond before the expiration of a period of ninety (90) days after the day on which the last of the labor was done or performed by him, or materials or equipment or machinery was furnished or supplied by him for which claim is made, shall have the right to sue on such payment bond for the amount, or the balance thereof, unpaid at the time of the commencement of such action and to prosecute such action to final execution and judgment for the sum or sums due him, provided, however, that any person having direct contractual relationship with a subcontractor, but no contractual relationship express or implied with the Contractor furnishing said payment bond shall have (a) given written notice to said Contractor within ninety (90) days from the day on which such person did or performed the last of the labor, or furnished the last of the materials or machinery or equipment for which such claim is made stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished or supplied or for whom the labor was performed or done; and (b) if the Contractor has filed a Notice of Commencement in accordance with the requirements of O.C.G.A. §13-10-62 and Articles 4.3.2 of the contract, given to said contractor a written Notice to Contractor within 30 days from the filing of the Notice of Commencement or 30 days following the first delivery of labor, materials, machinery or equipment, whichever is later, setting forth:

A) The name, address, and telephone number of the person providing labor, material, machinery, or equipment;

B) The name and address of each person at whose instance the labor, material, machinery or equipment is being furnished;

C) The name and the location of the public work; and

D) A description of the labor, material, machinery, or equipment being provided and, if known, the contract price or anticipated value of the labor, material, machinery, or equipment to be provided or the amount claimed to be due, if any.

It is provided further that nothing contained herein shall limit the right of action to said 90-day period. Notice may be served by the depositing of a notice, certified mail, postage paid, duly addressed to the Contractor at any place he maintains an office or conducts his business, or his residence, in any post office or branch post office or any letter box under the control of the Post Office

Department or notice may be served by statutory mail pursuant to O.C.G.A. §9-10-12 or in any manner in which the sheriffs of Georgia are authorized by law to serve summons or process. Every suit instituted under this section shall be brought in the name of the claimant without Owner being made a party thereof. The official who has custody of said bond is authorized and directed to furnish, to any person making application thereof who submits an affidavit that he has supplied labor or materials for such work and payment therefore has not been made, or that he is being sued on any such bond, a copy of such bond and the contract for which it was given, certified, by the official who has custody of said bond and contract shall be admitted in evidence without further proof. Applicants shall pay for such certified statements and such fees as the official fixes to cover the cost of preparation thereof, but in no case shall the fixed fee exceed the fees that the clerks of the superior courts are permitted to charge for similar copies.

(4) It is expressly agreed by the Principal and the Surety that the Owner, if he desires to do so, is at liberty to make inquiries at any time of subcontractors, laborers, materialmen, or other parties concerning the status of payments for labor, materials, or services furnished in the prosecution of the work.

(5) For the purposes of this bond, the name and address of the **responsible official of the Surety's claims department**, to whom correspondence and telecommunications may be addressed and/or with whom business concerning this bond may be conducted will be as follows:

NAME _____

TITLE _____

ADDRESS _____

CITY_____ STATE _____ ZIP CODE_____

TELEPHONE _____

(6) Further, this bond shall be the Payment Bond furnished under O.C.G.A. §§ 13-10-1, 13-10-60 *et seq.* and shall be subject to increase in the penal amount of the bond pursuant to such statutes and Article 1.5.1 of the Contract.

(7) No action can be instituted on this bond after one year from the date of Final Completion as determined pursuant to Article 6.2.2.

SIGNED AND SEALED THIS _____ DAY OF _____, 20_____.

ATTEST: (NAME OF Contractor)

_____ By_____
Secretary(*) President

_____
(SURETY) (*)(*)

_____
(TITLE)

(*) Please apply seal of Corporation over Secretary's Signature.
(*)(*)Please apply seal of Surety and arrange for countersignature by a "Georgia Licensed Agent" of Surety pursuant to O.C.G.A. §33-23-5. Kindly show title of the aforesaid agent as "Georgia Licensed Agent."

(*) Attach Power of Attorney

CONTRACTOR AFFIDVIT AND CERTIFICATE OF COMPLIANCE

GEORGIA SECURITY AND IMMIGRATION CERTIFICATION
(FEDERAL AND STATE WORK AUTHORIZATION PROGRAMS)

STATE OF GEORGIA;
COUNTY OF _____:

BOR PROJECT NO. _____
PROJECT NAME: _____

CONTRACTOR AFFIDAVIT, CERTIFICATE AND AGREEMENT

COMES NOW before me, the undersigned officer duly authorized to administer oaths, the undersigned contractor ("Contractor"), who, after being duly sworn, states, warrants, agrees and certifies as follows to the Board of Regents of the University System of Georgia ("Owner"), and _____ ("Using Agency"):

1.

By executing this affidavit, Contractor verifies and warrants its compliance with O.C.G.A. §13-10-90 *et seq.* and Georgia Department of Labor Rule 300-10-1-.01, and the U.S. Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603. Contractor must register and verify information of all new employees at https://www.vis-dhs.com/EmployerRegistration (the E Verify program) or any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program to verify information of newly hired employees, pursuant to the IRCA. Contractor affirmatively certifies that it has registered [or will register] with and is [or will] participate in a federal work authorization program in accordance with the applicability provisions and deadlines established in O.C.G.A. § 13-10-91 and Georgia Department of Labor Rule 300-10-1-.02, as initialed below.

2.

Contractor verifies and warrants it employs the following employees as of this date and meets or shall meet the requirements set forth above by the deadline for the category initialed below:

Initials	*Number of Employees*	*Required Compliance Date*
_____	Over 500 employees	July 1, 2007
_____	100 to 499 employees	July 1, 2008
_____	1 to 99 employees	July 1, 2009

Contractor utilized the following federal verification program:

_____ https://www.vis-dhs.com/EmployerRegistration (E Verify program)

_____ Other: _____

Verification Program User ID or Registration No. _____

3.

The Contractor further warrants and agrees that all subcontractors, suppliers and consultants contracted in connection with the provision of materials and equipment or performance of services or work for the Project described above shall be required prior to the commencement of any work on the project to supply the Subcontractor Certification verifying compliance with O.C.G.A. §13-10-90 *et seq.* and Georgia Department of Labor Rule 300-10-1-.01, and the U.S. Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603 and paragraph 5 below. Subcontractor must register and verify information of all new employees at https://www.vis-dhs.com/EmployerRegistration (the E Verify program) or other federal verification program. The affidavit must contain the certifications required by Georgia Department of Labor Rule 300-10-1-.08 and the requirements set forth herein. The Contractor shall maintain records of compliance and provide a copy of each such certification to the Owner and Using Agency as set forth in paragraph 5 below. Contractor warrants that Contractor has included this requirement in all written agreements with any subcontractors engaged to perform services for this Project.

4.

The Contractor further warrants and agrees to comply with the President's Executive Order 13224, which mandates that no U.S. company shall do business with any person (Prohibited Person) who has been determined to have committed, or pose a risk of committing or supporting terrorist acts, and those identified on the list of Specially Designated Nationals and Blocked Persons, generated by the Office of Foreign Assets Control ("OFAC"). The OFAC list is updated regularly, and an up-to-date OFAC list can be obtained from the U.S. Department of the Treasury website at http://www.ustreas.gov/ofac. This Executive order extends to "Affiliates," which includes any other person or entity who, directly or indirectly, is in control of, is controlled by or is under common control with any Prohibited Person. A copy of the Executive Order can be obtained at http://www.ustreas.gov/offices/enforcement/ofac/sanctions/terrorism.html and the USA Patriot Act of 2001, restricting terrorist groups' access to financial resources in the United States can be obtained at http://www.fincen.gov/pa_main.html for review. The Contractor agrees to review its subcontracts and other agreements annually with the Treasury website for compliance, and maintain a record of its reviews.

5.

Contractor warrants and agrees that it shall submit, and shall ensure all its subcontractors and suppliers submit, the required certifications and verifications (i) at contract execution prior to commencing work or services; (ii) upon the completion or termination of the contract; and (iii) and recertified as of July 15 of each year during the term of the Project. The required certificates must be filed with the Owner and Using Agency and copies maintained by the Contractor in its Project files and retained for audit as specified in the Project contract. State officials, including officials of the Georgia Department of Labor, officials of the Owner, retain the right to inspect and audit the Project Site and employment records of the Contractor, subcontractors, suppliers and consultants without notice during normal working hours until Final Completion, and as otherwise specified by law and by Rules and Regulations of the Georgia Department of Labor.

Contractor Name: _____

Street/Mailing Address: _____

City, State, Zip _____

Telephone Number: _____

Facsimile Number: _____

Email Address: _____

FURTHER AFFIANT SAYETH NOT.

_____
Contractor Name

By: _____
Signature of Authorized Officer or Agent

_____
Printed Name of Authorized Officer or Agent

_____
Title of Authorized Officer or Agent

Sworn to and subscribed before me
by the affiant named above as of this

_____day of _____, 200___

_____
Notary Public

My commission expires:_____

SUBCONTRACTOR AFFIDAVIT AND CERTIFICATE OF COMPLIANCE
GEORGIA SECURITY AND IMMIGRATION CERTIFICATION
(FEDERAL AND STATE WORK AUTHORIZATION PROGRAMS)

STATE OF GEORGIA;
COUNTY OF _____:

BOR PROJECT NO. _____
PROJECT NAME: _____

SUBCONTRACTOR AFFIDAVIT, CERTIFICATE AND AGREEMENT

COMES NOW before me, the undersigned officer duly authorized to administer oaths, the undersigned subcontractor, supplier or consultant ("Subcontractor"), who, after being duly sworn, states, warrants, agrees and certifies as follows to the Board of Regents of the University System of Georgia ("Owner"), and to _____ ("Using Agency"):

1.

By executing this affidavit, Subcontractor verifies and warrants its compliance with O.C.G.A. §13-10-90 *et seq.* and Georgia Department of Labor Rule 300-10-1-.01, and the U.S. Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603. Subcontractor must register and verify information of all new employees at https://www.vis-dhs.com/EmployerRegistration (the E Verify program) or any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program to verify information of newly hired employees, pursuant to the IRCA. Subcontractor affirmatively certifies that it has registered [or will register] with and is [or will] participate in a federal work authorization program in accordance with the applicability provisions and deadlines established in O.C.G.A. § 13-10-91 and Georgia Department of Labor Rule 300-10-1-.02, as initialed below.

2.

Subcontractor verifies and warrants it employs the following employees as of this date and meets or shall meet the requirements set forth above by the deadline for the category initialed below:

Initials	*Number of Employees*	*Required Compliance Date*
_____	Over 500 employees	July 1, 2007
_____	100 to 499 employees	July 1, 2008
_____	1 to 99 employees	July 1, 2009

Subcontractor utilized the following federal verification program:

_____ https://www.vis-dhs.com/EmployerRegistration (E Verify program)

_____ Other: _____

Verification Program User ID or Registration No. _____

3.

The Subcontractor further warrants and agrees that all subcontractors, suppliers and consultants contracted in connection with the provision of materials and equipment or performance of services or work for the Project described above shall be required prior to the commencement of any work on the project to supply the Subcontractor Certification verifying compliance with O.C.G.A. §13-10-90 *et seq.* and Georgia Department of Labor Rule 300-10-1-.01, and the U.S. Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603 and paragraph 5 below. Subcontractor must register and verify information of all new employees at https://www.vis-dhs.com/EmployerRegistration (the E Verify program) or other federal verification program. The affidavit must contain the certifications required by Georgia Department of Labor Rule 300-10-1-.08 and the requirements set forth herein. The Subcontractor shall maintain records of compliance and provide a copy of each such certification to the Owner and Using Agency as set forth in paragraph 5 below.

Subcontractor warrants that Subcontractor has included this requirement in all written agreements with any subcontractors engaged to perform services for this Project.

4.

The Subcontractor further warrants and agrees to comply with the President's Executive Order 13224, which mandates that no U.S. company shall do business with any person (Prohibited Person) who has been determined to have committed, or pose a risk of committing or supporting terrorist acts, and those identified on the list of Specially Designated Nationals and Blocked Persons, generated by the Office of Foreign Assets Control ("OFAC"). The OFAC list is updated regularly, and an up-to-date OFAC list can be obtained from the U.S. Department of the Treasury website at http://www.ustreas.gov/ofac. This Executive order extends to "Affiliates," which includes any other person or entity who, directly or indirectly, is in control of, is controlled by or is under common control with any Prohibited Person. A copy of the Executive Order can be obtained at http://www.ustreas.gov/offices/enforcement/ofac/sanctions/terrorism.html and the USA Patriot Act of 2001, restricting terrorist groups' access to financial resources in the United States can be obtained at http://www.fincen.gov/pa_main.html for review. The Subontractor agrees to review its subcontracts and other agreements annually with the Treasury website for compliance, and maintain a record of its reviews.

5.

Subcontractor warrants and agrees that it shall submit, and shall ensure all its subcontractors and suppliers submit, the required certifications and verifications (i) at contract execution prior to commencing work or services; (ii) upon the completion or termination of the contract; and (iii) and recertified as of July 15 of each year during the term of the Project. The required certificates must be filed with the Owner and Using Agency and copies maintained by the Subcontractor in its Project files and retained for audit as specified in the Project contract. State officials, including officials of the Georgia Department of Labor, officials of the Owner, retain the right to inspect and audit the Project Site and employment records of the Subcontractor, subcontractors, suppliers and consultants without notice during normal working hours until Final Completion, and as otherwise specified by law and by Rules and Regulations of the Georgia Department of Labor.

Subcontractor Name: _____

Street/Mailing Address: _____

City, State, Zip _____

Telephone Number: _____

Facsimile Number: _____

Email Address: _____

FURTHER AFFIANT SAYETH NOT.

_____
Subcontractor Name

By: _____
Signature of Authorized Officer or Agent

_____
Printed Name of Authorized Officer or Agent

_____
Title of Authorized Officer or Agent

Sworn to and subscribed before me
by the affiant named above as of this

_____day of _____, 200___

_____
Notary Public

My commission expires:_____

NON-INFLUENCE AFFIDAVIT

COUNTY OF _____

STATE OF _____

I do solemnly swear on my oath that as to the Contract dated_____, 20_____, between _____
(NAME OF CONTRACTOR)

and the Owner, I have no knowledge of the exertion of any influence or the attempted exertion of any influence on the firm on behalf of which this affidavit is made in any way, manner, or form in the purchase of materials, equipment, or other items involved in construction, manufacture, or employment of labor under the aforesaid Contract by any employee, officer, or agent of the Owner, or any person connected with the State Government of Georgia in any way whatsoever.

This _____ day of _____, 20_____.

_____(L.S.)
Signature

_____
Title

_____
Firm

COUNTY OF _____

STATE OF _____

Personally before me, the undersigned authority, appeared_____
(NAME OF PERSON SIGNING THE AFFIDAVIT)

who is known to me to be an official of the firm of _____,
(NAME OF CONTRACTOR)

and who, after being duly sworn, stated on his oath that he had read the above statement and that the same is true and correct.

_____
Notary Public

My Commission expires _____

This_____ day of _____, 20____.

STATUTORY AFFIDAVIT

COUNTY OF _____ STATE OF _____

FROM: _____
Contractor

TO: _____
Owner

Re: Contract entered into the _____ day of _____, 20____, between the above-mentioned parties for the construction

of Project No. _____ located at _____

KNOW ALL MEN BY THESE PRESENTS:

1. The undersigned hereby certifies that all work required under the above Contract has been performed in accordance with the terms thereof, that all Subcontractors, Suppliers, Trade Contractors, mechanics, and laborers have been paid and satisfied in full, or will be paid and satisfied in full out of the proceeds of this payment as set forth in O.C.G.A. §13-10-80, and that there are no outstanding claims of any character [including disputed claims or any claims to which the Contractor has or will assert any defense] arising out of the performance of the Contract which have not been paid and satisfied in full except as listed herein below:.....

_____

Instructions to Contractor- ENTER THE WORD "NONE" OR LIST THE NAMES OF CLAIMANTS

2. The undersigned further certifies that to the best of his knowledge and belief there are no unsatisfied claims for damages resulting from injury or death to any employees, Subcontractors, or the public at large arising out of the performance of the contract, or any suits or claims for any other damage of any kind, nature, or description which might constitute a lien upon the property of the Owner.

3. The undersigned makes this affidavit for the purpose of receiving final payment in full settlement of all claims against the Owner arising under or by virtue of the contract, and acceptance of such payment is acknowledged as a release of the Owner from any and all claims arising under or by virtue of the contract.

This _____ day of _____, 20_____.

_____(L.S.)
Signature

_____
Title

_____
Firm

COUNTY OF _____ STATE OF _____

Personally before me, the undersigned authority, appeared_____
(NAME OF PERSON SIGNING THE AFFIDAVIT)

who is known to me to be an official of the firm of _____,
(NAME OF CONTRACTOR)

and who, after being duly sworn, stated on his oath that he had read the above statement and that the same is true and correct.

_____
Notary Public

My Commission expires _____

This_____ day of _____, 20____.

FIVE YEAR BOND ON ROOFS AND WALLS

STATE OF GEORGIA

COUNTY OF _____

Firmly Bound. Know all men by these presents, that we, _____ ("Contractor") as Principal, and_____, as Surety, are held and firmly bound unto _____,
(Insert Name of Owner)
Owner, in the sum of_____ Dollars ($_____) for the payment of which well and truly to be made and done, we bind ourselves, our executors and administrators, our successors and assigns, jointly and severally, by these presents.

Condition of Obligation. The condition of the above obligation is such that WHEREAS Contractor has entered into a Contract with Owner dated_____ (enter date of contract), for construction of Project No._____.

Warranty. WHEREAS, the said Contractor warrants with respect to the said work that for a period of five years from the date of the execution of the final certificate of the Design Professional, the roofs of the building (or buildings) and roofs of passages, including but not limited to the roof envelope, including but not limited to the roof decking; deck sheathing; material used as a roof base or insulation over which roof is applied; roofing materials; promenade decks or any other work on the surface of the roof; flashing; base flashing; counter flashing; metal work, gravel stops; or roof expansion joints shall be absolutely watertight and free from all leaks. At no expense to the Owner, the Contractor will make repairs to any defects that may develop in the work including but not limited to: blisters, exposed felts, ridges, wrinkles, splits, warped insulation, and loose flashing, in a manner compatible to the system and acceptable under industry standards and in accordance with the construction specifications. The Contractor also warrants that for the same five-year period the walls of the building (or buildings) and building envelope, including but not limited to: vertical and/or horizontal expansion joints, below and/or above grade waterproofing, below and/or above grade damp-proofing, thru-wall flashing, damp course flashing and waterproofing of joints at openings in walls including but not limited to door perimeters, window perimeters, vents and pipe openings shall be absolutely watertight and free from all leaks, seepage or dampness, and that he shall, at no expense to the Owner, make repairs to any defects that may develop in the work in a manner compatible to the system and acceptable under industry standards and in accordance with the construction specifications, Provided, however: That the following are excluded from the warranty:

(a) Defects or failures resulting from abuse by the Owner, upon presentation of competent evidence of same by the Contractor.

(b) Defects in design that the said Contractor shall produce competent evidence of having had provided clear written notice in writing to the Owner prior to commencing installation of the Work, except, however, that the Contractor shall not be responsible, insofar as liability under this bond is concerned, for bringing to the attention of the Owner defects in design involving failure of only the following three structural elements:

(1) Structural Frame
(2) Load bearing walls
(3) Foundations

nor shall the Contractor be responsible for correction of leaks resulting from said failure.

(c) Damage caused by fire, tornado, hail, hurricane, acts of God, wars, riots, or civil commotion upon presentation of competent evidence of same by the Contractor..

(d) The Contractor is not an insurer nor is he a guarantor of the design. Any other provisions of this bond to the contrary notwithstanding, the Contractor shall not be required to remedy any errors or omissions of design.

Leaks or Defects. WHEREAS the said **Contractor** agrees that should any leaks or defects occur in the roof envelope or wall envelope of the said (Name and Number of Project) the said **Contractor** will promptly remedy the said leaks or defects and pay for any damage to other work of said Project resulting therefrom, except, however, that when this instrument is executed by a Trade Contractor this Contract, shall, insofar as the Trade Contractor is concerned, extend only to the work executed by said Trade Contractor.

Notice to Surety. If the Contractor shall have been given notice to remedy leaks or defects pursuant to the Contract Documents and has been declared in default by the Owner and the Owner has terminated the Contractor's right to complete the remedy, the Surety shall be notified in writing and shall promptly perform this bond agreement in accordance with its terms and conditions. If Surety chooses to investigate, Owner shall cooperate with the Surety in its investigation and shall make all public project records available for inspection by Surety at no cost to Owner. It shall be the duty of the Surety to give an unequivocal notice in writing to the Owner, within twenty-five

(25) days after receipt of such notice, of the Surety's election to either remedy the leaks and defects promptly, time being of the essence. In said notice of election, the Surety shall indicate the date on which the remedy or performance will commence, and it shall then be the duty of the Surety to give prompt notice in writing to the Owner immediately upon completion of the remedy and/or correction of the leaks or defects. The Surety shall not assert its Principal as justification for its failure to give notice of election or for its failure to promptly remedy the leaks or defects.

Full Force and Effect. NOW, THEREFORE, the condition of this obligation is such that if the Contractor_ shall in all things promptly and faithfully perform and comply with the terms and conditions hereinbefore set forth, then this obligation shall be null and void; otherwise, it shall remain in full force and effect.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be duly executed this _____ day of _____, 20___.

_____ WITNESS
Principal

By:_____ _____

TITLE_____ _____

_____ WITNESS
Surety

By:_____ _____

TITLE_____ _____

(*) Attach Power of Attorney

Instructions for execution by Contractor

(a) If the firm is a partnership, all members of the partnership must execute.
(b) If the firm is a corporation, the president must sign, the secretary must attest, and the Seal of Corporation must be affixed.
(c) If the firm operates as a sole proprietorship, the proprietor must execute.

SPECIMEN CERTIFICATE OF MANUFACTURER

INSTRUCTIONS FOR PREPARATION OF CERTIFICATE: To be acceptable, the certificate must be prepared in the form indicated by this specimen on the official letterhead of the manufacturer. No portions of the certificate may be omitted. Attached is a copy of the Contract provision under which the certificate is required. The Authority needs only one copy of the certificate. If equipment of a manufacturer is not installed in strict compliance with the recommendations of the manufacturer or if in the design of the work the equipment is not applied in strict compliance with the recommendations of the manufacturer, a letter from the manufacturer should be forwarded to the Contractor [with copies to the Design Professional and the Owner] setting forth a list of the deviations from the recommendations of the manufacturer and stating what remains to be done in order to bring the work into strict compliance with the recommendations of the manufacturer. Prior to calling upon the representative of the manufacturer for performance of the services necessary to enable him to execute a certificate in accordance with this specimen, it is the obligation of the Contractor to have installed the work in strict compliance with the recommendations of the manufacturer [See Article 2.2.4 of the Contract], and it is likewise the obligation of the Contractor to have put the equipment in good operating condition in absolute and final readiness for the "start-up," "testing," and "placing into operation" as defined herein below by the representative of the manufacturer.

Date:_____

Insert name and address of Owner

Re: Certificate of [JOHN DOE CORPORATION] that equipment or components furnished by it has [or have, as the case may be] been installed in strict compliance with its recommendations and is [or are, as the case may be] operating properly at PROJECT NO._____

Gentlemen:

1. We certify through our duly authorized and acting agent that the following item [or items, as the case may be] furnished by us to the Project named in the caption was [or were, as the case may be] started up, tested, and placed in operation by our authorized field representative on [enter the date on which the field representative performed the start-up, test, and placing into operation] and is [or are, as the case may be] operating properly:

[List the item or items furnished to the job. Show catalogue number or numbers.]

2. We certify further that the aforesaid equipment was installed in strict compliance with our recommendations as published by us in the following document [or documents, as the case may be]:

[Insert the date, name, or other positive means of identifying the exact document or documents in which the recommendations for installation and use of the item or items are published.] (*)

3. A copy of the aforesaid document(s) is (are) attached hereto.

This _____ day of_____, 20____

JOHN DOE CORPORATION

By:_____
Authorized Representative

(*) The date must be shown
[See Article 6.4.1.2.5
DEFINITIONS:
l. "Start-up" is defined as putting the equipment into action.
2. "Testing" is defined as performing such testing as is stipulated in the Contract Documents to be performed.
3. "Placing into operation" is defined as operating the equipment for a sufficient period of time for the determination to be made that it is performing properly.

INSTRUCTIONS TO PRODUCING AGENT: COMPLETE THE SHADED PORTIONS OF THIS CERTIFICATE OR SIMILAR FORM AND RETURN TO THE INSURED, WITH ADDITIONAL INSURED ENDORSEMENTS ATTACHED. NO CONDITION, TERM, QUALIFICATION, LIMITATION, EXCEPTION, EXEMPTION, MODIFICATION, OR PROVISO SHALL APPEAR ON THE CERTIFICATE.

Certificate of Insurance

Name, Address and Telephone Number of Producing Agent	**PROJECT NO.**: Project Number Here
	PROJECT NAME: Project Description, Institution Here
Name and Address of Insured Contractor (Contractor)	**Certificate Holder(Owner)**: Board of Regents of the University System of Georgia Dalton State College 650 College Dr. Dalton, Georgia 30720 On behalf of

Type of Insurance	Policy No.	Company Affording Coverage	Policy Expiration Date	Limits
Commercial General Liability(1993 ISO Occurrence Form or its equivalent); Includes XCU Coverage				Each Person $1,000,000.00 Each Occurrence $1,000,000.00 Products-Co./Op Agg $1,000,000.00 Personal & Adv injury $1,000,000.00 Contractual $1,000,000.00 General Aggregate $2,000,000.00
Commercial Business Automobile Liability				Bodily Injury $1,000,000.00 Property Damage $1,000,000.00 Combined Single Limit $1,000,000.00
Commercial Umbrella Liability				Each Occurrence $2,000.000.00 Aggregate $4,000,000.00
Workers Compensation				W C Statutory Limits
Employers' Liability				Each Accident $1,000,000.00 Disease Each Employee $1,000,000.00 BI - Disease-Aggregate $1,000,000.00
Builders Risk written on 1991 Cause of Loss-Special Form or its equivalent OR **Installation Floater** (for other than new construction)				Cost of Project

The insured contractor has provided the contract provisions concerning insurance to the Undersigned, and the Undersigned had reviewed the insurance coverages required for the project referenced above and makes the following certifications, which shall serve to bind the various insurance carriers as follows:

1. Such insurance as is herein certified (i) are written in accordance with the company's regular policies and endorsements, subject to the company's applicable manuals or rules and rates in effect, (ii) have been issued to the insured named above, and (iii) are in force at this time.
2. With the exception of the Workers Compensation policy, the Officers, Members, Agents, & Employees of the Owner and the State of Georgia are included as additional insureds as their interests may appear and a copy of the additional insured endorsement(s) is attached hereto. The undersigned certifies that he has so notified each Insurer that Georgia law requires that the Attorney General of Georgia shall represent and defend the state entities and Indemnities named herein remains in full force and effect and is not waived by issuance of any policy of insurance Disease Each Employee $1,000,000.00
BI - Disease-Aggregate $1,000,000.00.
3. Each policy either provides or has been endorsed to meet Georgia law that the policy shall not be canceled, changed, allowed to lapse, or allowed to expire for any reason until thirty (30) days (10 days for non-payment of premium) after the Certificate holder has received written notice thereof as evidenced by return receipt of certified or overnight letter.

Authorized Representative: _____ Date: _____

Typed Name: _____

THIS FORM IS FOR OPTIONAL USE TO RELEASE TO THE CONTRACTOR FUNDS WITHHELD FROM A PAY APPLICATION IN THE EVENT A SUBCONTRACTOR FILES A CLAIM AGAINST THE CONTRACT BALANCE HELD BY THE OWNER THAT REMAINS UNRESOLVED. THIS IS A SUBORDINATE DOCUMENT TO THE PAYMENT BOND FOR THE PROJECT, AND IS CALCULATED AGAINST THE PENAL AMOUNT OF THAT PAYMENT BOND. THERE ARE OTHER METHODS THAT MAY BE USED TO REMEDY SUCH SITUATIONS, HOWEVER, THIS FORM IS EFFECTIVE WHEN NONE OF THE PARTIES ARE ABLE TO REACH AGREEMENT UPON THE CLAIM.

BOND TO DISCHARGE CLAIM

WHEREAS, _____ (hereinafter referred to as "Claimant" has filed a claim against _____ (the "Contractor", hereinafter referred to as "Principal") on the following contract:

WHEREAS, the undersigned Principal and Surety have issued Payment Bond No. _____ (the "Primary Bond") to the Owner, as Obligee, on the Contract dated _____ for Project _____ _____ ;

WHEREAS, the undersigned Principal and Surety dispute the Claimant's entitlement to all or part of the claim and expressly reserve all rights and defenses available at law in connection therewith;

WHEREAS, _____ as Principal and _____ as Surety, desire to continue to receiving payments from the Owner for work done on the above referenced project,

NOW THEREFORE, in consideration of these premises, the undersigned Principal and Surety do hold themselves firmly bond unto _____ as Claimant, in the total amount of _____ dollars ($_____), representing double the amount of the claim.

The condition of this Bond to Discharge Claim is such that should the undersigned Principal or Surety pay to the Claimant the sum that may be found to be due to the Claimant upon the trial of any action that may be filed by said Claimant, or if Principal or Surety pay to the Claimant a sum agreeable to Claimant and Claimant accepts such payment, then this Bond shall be void; otherwise to remain in full force and effect.

The penal amount of the Primary Bond is conditionally reduced by the amount of this Bond to Discharge Claim, and upon payment of any sums to the Obligee under this Bond to Discharge Claim, the penal amount of the Primary Bond is reduced *instanter* by the amount of such payment.

No action can be instituted on this bond after one year from the date of Final Completion as determined pursuant to Article 6.2.2 of the Contract.

IN WITNESS WHEREOF, the said Principal and Surety have set their hands and seals this ____ day of _____, 20___.

_____
Principal

by:_____

_____
Surety

by:_____
Attorney-in-Fact

_____
Type Name Above

CHANGE ORDER FORMAT
(Lump Sum)

CHANGE ORDER No. _____

Project Name: _____
Project Number: _____

Owner

1. Submission of this Change Order for consideration was authorized by letter from the Owner, dated ____, 200__, Incumbrance Record No. _____.

2. The changes hereinafter described are applicable to the Contract for the construction of the above-referenced Project and amend the Contract Documents.

3. Description of Change:

4. This Change Order is deemed necessary and originated with the (Design Professional) (Owner) (Contractor) (Using Agency). *(Indicate applicable entity.*)

5. This Change Order is necessary to:

6. The amount of the Change Order was determined by:

7. A memorandum is attached showing cost breakdown of labor and materials by unit and quantities as prepared by the Contractor and checked by the Contract Compliance Specialist and Program Manager (if any).

8. We have verified the quantity and quality of all materials shown on the memorandum. We have verified that all prices are reasonable and do not exceed current costs for like services or materials, and we have verified that the quality of the materials meets the requirements of the Contract Documents.

9. The contractor shall be allowed _____ additional calendar days for completion. The Material Completion and Occupancy Date is: _____ .

10. The Contract Sum shall be *(increased) (decreased)* by $ _____ on account of this change.

11. The payment and extension of time, if any, provided by this Change Order constitutes compensation in full to the Contractor and its Subcontractors, Suppliers, and Trade Contractors for all costs and markups, directly and indirectly attributable to the changes ordered herein, and for all delays or time related costs thereto and for any acceleration costs for performance of changes within the time stated and to be completed by the Material Completion and Occupancy Date and for any claims related thereto against the Owner and the Design Professional, and design consultants.

RECOMMENDED FOR OWNER'S ACCEPTANCE:

(DESIGN PROFESSIONAL)

By: _____

Date approved by Design Professional: _____

APPROVED AND AGREED BY OWNER:

BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA

By: _____

Date approved by Owner: _____

APPROVED AND AGREED BY CONTRACTOR:

By: _____

Date approved by Contractor: _____

APPROVED AND AGREED BY USING AGENCY

By: _____

Date approved by Using Agency: _____

CHANGE ORDER FORMAT
(Force Account or Indeterminate Units)

CHANGE ORDER No. _____

Project Name: _____
Project Number: _____

Owner

1. Submission of this Change Order for consideration was authorized by letter from the Owner, dated ____, 200__, Incumbrance Record No. _____.

2. The changes hereinafter described are applicable to the Contract for the construction of the above-referenced Project and amend the Contract Documents..

3. Description of Change:

4. This Change Order is deemed necessary and originated with the (Design Professional) (Owner) (Contractor) (Using Agency). *(Indicate applicable entity.*)

5. This Change Order is necessary to:

6. The Maximum Allowable Cost of the Change Order was estimated by:

7. A memorandum is attached showing the estimated cost breakdown of labor and materials by unit and quantities as prepared by the Contractor and checked by the Contract Compliance Specialist and Program Manager (if any).

8. The Maximum Allowed Cost for this Change Order is $ _____, and is established as Incumbrance Record No. _____ . This Maximum Allowed Cost may be amended by the Owner in the event the actual costs are expected to exceed the Maximum Allowed Cost, provided that Contractor shall give written notice of such fact prior to incurring actual costs in excess of ninety percent of the Maximum Allowable Cost. In no event shall actual costs be incurred in excess of the Maximum Allowed Cost, as it may be amended.

RECOMMENDED FOR OWNER'S ACCEPTANCE:

(DESIGN PROFESSIONAL)

By: _____

Date approved by Design Professional: _____

APPROVED AND AGREED BY OWNER:

BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA

By: _____

Date approved by Owner: _____

APPROVED AND AGREED BY CONTRACTOR:

By: _____

Date approved by Contractor: _____

APPROVED AND AGREED BY USING AGENCY

By: _____

Date approved by Using Agency: _____

FINAL COST AMENDMENT
TO
CHANGE ORDER NO. _____

1. A memorandum is attached showing cost breakdown of labor and materials by unit and quantities as prepared by the Contractor and checked by the Contract Compliance Specialist and Program Manager (if any).

2. We have verified the quantity and quality of all materials shown on the memorandum. We have verified that all prices are reasonable and do not exceed current costs for like services or materials, and we have verified that the quality of the materials meets the requirements of the Contract Documents.

3. The contractor shall be allowed _____ additional calendar days for completion. The Material Completion and Occupancy date is: _____ .

4. The Contract Sum shall be *(increased) (decreased)* by $ _____ on account of this change.

5. The payment and extension of time, if any, provided by this Change Order constitutes compensation in full to the Contractor and its Subcontractors, Suppliers, and Trade Contractors for all costs and markups, directly and indirectly attributable to the changes ordered herein, and for all delays or time related costs thereto and for any acceleration costs for performance of changes within the time stated and to be completed by the Material Completion and Occupancy Date and for any Claims related thereto against the Owner and the Design Professional, and design consultants.

RECOMMENDED FOR OWNER'S ACCEPTANCE:

(DESIGN PROFESSIONAL)

By: _____

Date approved by Design Professional: _____

APPROVED AND AGREED BY OWNER:

BOARD OF REGENTS OF THE UNIVERSITY SYSTEM OF GEORGIA

By: _____

Date approved by Owner: _____

APPROVED AND AGREED BY CONTRACTOR:

By: _____

Date approved by Contractor: _____

APPROVED AND AGREED BY USING AGENCY

By: _____

Date approved by Using Agency: _____

APPLICATION FOR PAYMENT

APPLICATION FOR PAYMENT NO._____ PROJECT NO.

CERTIFICATE OF THE CONTRACTOR OR HIS DULY AUTHORIZED REPRESENTATIVE

To the best of my knowledge and belief, I certify that all items, units, quantities, and prices of work and material shown on this Application for Payment No. _____ are correct; that all work has been performed and materials supplied in full accordance with the terms and conditions of the Contract Documents between

(Owner)

and _____ dated

(Contractor)

and all authorized changes thereto; and that the following is a true and correct statement of the contract account up to and including the last day of the period covered by this Application and that no part of the "amount due this Application" has been received.

(a)	Total amount earned for work in place (original contract)	$
(b)	Total amount earned for work in place (Change Orders)	$
(c)	Value of materials stored at site	$
(d)	Total amount earned ((a) plus (b) plus (c))	$
(e)	Amount retained (10%)	$
(f)	Total earned less retained percentage ((d) minus (e))	$
(g)	Total previously approved	$
(h)	Amount due THIS ESTIMATE ((f) minus (g))	$
(i)	Retainage payment to Subcontractors per Paragraph 4 .1.2.5 of the General Conditions.	$
(j)	AMOUNT DUE Contractor ((h) minus (i))	$

I further certify that all claims outstanding against the undersigned Contractor for labor, materials, and expendable equipment employed in the performance of said contract have been paid in full in accordance with the requirements of said contract, except such outstanding claims as are listed below or on the attached sheet, which statement contains all claims against the Contractor which are not yet paid, including all disputed claims and any claims to which the Contractor has or will assert any defense.

I further certify that all of the materials indicated on this Application for Payment as being stored on the Site, but not yet incorporated into the building, have been purchased, delivered, and are now stored on the Site for future incorporation into the building and until so incorporated the title to same is, upon payment of this statement, vested in the Owner. Furthermore, the undersigned Contractor assumes full responsibility for the existence, protection, and, if necessary, replacement of the above-mentioned materials until the completion of this contract.

Contractor_____ By

Date _____ Title

STATEMENT OF THE CONTRACT COMPLIANCE SPECIALIST

I have checked this Application for Payment and, to the best of my knowledge and belief, the statement of work performed and statement of materials stored on site by the Contractor are supported by my observations

Name_____ Contract Compliance Specialist. Date:

CERTIFICATE OF THE DESIGN PROFESSIONAL

I certify that I have verified this Application for Payment and, to the best of my knowledge and belief, it is a true and correct statement of work performed and statement of materials stored on site by the Contractor and that the Contractor's certified statement of his account and the amount due him is correct and just. I further certify that all work has been performed and materials have been supplied in full accordance with the terms and conditions of the Contract Documents and authorized changes thereto.

Name_____ Design Professional. Date:

SCHEDULE OF CHANGE ORDERS

In support of Application for Payment No.

Project No._____ Period Ending:

Contractor:

CHANGE ORDERS		ADDITIONS			DEDUCTIONS
Number (1)	Date (2)	Authorized Amount (3)	Amount this Period (4)	Completed Previous Periods (5)	Authorized Deductions (6)

WORK PERFORMED TO DATE

In support of Application for Payment No.

For the period from _____, through _____ inclusive.

Project No.

Name and location of Project

Contractor's Name and Address

WORK INCLUDED IN ORIGINAL CONTRACT

DETAILED ESTIMATE				WORK PERFORMED TO DATE			
CSI Category and Description Item No. and Designation (1)	Number & Kind of Units (2)	Unit Price (3)	Estimated Cost (4)	No. of Units (5)	Amount Earned to Date (6)	Value of Incomplete Work (7)	Percent Complete (8)
A. Contracting Requirements: *							
a.							
b.							
c,							
1. Division 1 – General Requirements: *							
a.							
b.							
c.							
2. Division 2 – Site Construction: **							
(i) Building							
a.							
b.							
c.							
(ii) Infrastructure							
a.							
b.							
c.							
3. Division 3 – Concrete: *							
a.							
b.							
c.							
4. Division 4 – Masonry: **							
(i) Building							
a.							
b.							
c.							
(ii) Infrastructure							
a.							
b.							
c.							
5. Division 5 – Metals: *							
a.							
b.							

c.							
6. Division 6 – Wood and Plastics: *							
a.							
b.							
c.							
7. Division 7 – Thermal & Moisture: ***							
a.							
b.							
c.							
Roof:							
8. Division 8 – Doors & Windows: *							
a.							
b.							
c.							
9. Division 9 – Finishes: *							
a.							
b.							
c.							
10. Division 10 – Specialties: *							
a.							
b.							
c.							
11. Division 11 – Equipment: ***							
(i) Fixed or Built-in:							
a.							
b.							
c.							
(ii) Moveable:							
a.							
b.							
c.							
12. Division 12 – Furnishings: ***							
(i) Fixed or Built-in:							
a.							
b.							
c.							
(ii) Moveable:							
a.							
b.							
c.							
13. Division 13 – Special Construction: *							
a.							
b.							
c.							
14. Division 14 – Conveying Systems: *							
a.							
b.							
c.							
15. Division 15 – Mechanical: ****							
(i) Building							
a.							
b.							
c.							
(ii) Infrastructure							
a.							
b.							
c.							
16. Division 16 – Electrical: **							
(i) Building							
a.							

b. c. (ii) Infrastructure a. b. c. 17. Division 17 – Special Inspections: ** (i) Building a. b. c. (ii) Infrastructure a. b. c. (iii) Documents							
A. Total Amount of original contract							
B. Plus or minus total previously approved C. O.'s Nos.---------- incl.							
C. Plus or minus C. O.'s Nos.----------incl. approved during period covered by this est.----------							
D. Total Net Adjusted Amt.							

NOTES: The following breakdowns must be accomplished in order to comply with Government Accounting requirements. Upon completion of the Project, the final Application for Payment must show all divisions and sections, and a Final Certification of Costs for Capital Asset Accounting completed and submitted with the Application for Final Payment.

*** Report Items in each division, by CSI division and such other breakdown as is useful to the Contractor or Contract Compliance Specialist.**

**** These items must be broken down into 2 categories, (i) Building and (ii) Infrastructure, reported by specification section. Infrastructure for these purposes is defined as everything outside a line five feet from the building footprint.**

***** These items must be broken down into 2 categories; (i) fixed equipment & furnishings and (ii) Moveable equipment & furnishings and reported by specification section.**

****** Division 15 – Mechanical. This item must be broken down into 2 categories, (i) Building and (ii) Infrastructure, reported by specification section. Chillers and HVAC units that serve the facility are to be included as a part of the Building, even if they are outside the 5-foot limit. Chillers and HVAC units that are outside the 5 foot limit and serve more than one facility, such as equipment used in a central plant, are to be included in Infrastructure.**

******* Division 7 – Thermal & Moisture Components of the Roof system should be reported as a separate line item. Generally, this includes components of Sections 7500 and 7600.**

SUMMARY OF MATERIALS STORED

In support Application for Payment No.

Project No._____ Period Ending:

Contractor:

ITEM NO.	NAME (Contractor or Subcontractor)	TYPE OF MATERIAL	QUANTITY	AMOUNT (Dollars)
		TOTALS		

Prepared by_____ for
(Contractor)

Date_____, and certified by him to be a true and accurate statement.

Checked:

By:
Contract Compliance Specialist

Date:

SUBCONTRACTOR RETAINAGE RELEASE CERTIFICATE

(To be Originated by Subcontractor

TO: Board of Regents of the University System of Georgia
_____
_____

RE: Project Name and Number:_____:
Certificate Regarding Subcontractor's Completed Work and Retainage Release

1. This is to certify that our work is one hundred percent complete for our subcontract number _____. Our retainage is due in accordance with the contract documents. Our scope of work included the _____. The total amount of retainage now due is $_____.

2. The Subcontractor hereby certifies that all work required under the above contract has been performed in accordance with the terms thereof, that all materialmen, subcontractors, mechanics, and laborers have been paid and satisfied in full, and that there are no outstanding claims of any character (including disputed claims or any claims to which the subcontractor has or will assert any defense) arising out of the performance of the contract which have not been paid and satisfied in full except as listed hereinbelow, which exceptions apply only to the release in Paragraph 5, below:

[Enter: "None" or List or Make Reference & Attach Exhibit A.]

3. The Subcontractor further certifies that to the best of his knowledge and belief there are no unsatisfied claims for damages resulting from injury or death to any employees, subcontractors, or the public at large arising out of the performance of the contract, or any suits or claims for any other damage of any kind, nature, or description which might constitute a claim or lien upon the property of the Owner.

4. The Subcontractor has received final payment in full settlement of all claims against the Owner arising under or by virtue the contract, and acceptance of such payment is acknowledged as a release of the Owner from any and all claims arising under or by virtue of the contract. This release includes any claims set forth or excepted in Paragraph 2 above.

5. [*Strike out if not applicable*] The Subcontractor has received final payment in full settlement of all claims against the Contractor arising under or by virtue the contract, and acceptance of such payment is acknowledged as a release of the Contractor from any and all claims arising under or by virtue of the contract except as set forth in Paragraph 2 above.

6. Payments pursuant to this certificate shall in no way diminish, change, alter or affect the rights of the Owner under the contract documents.

SUBCONTRACTOR:

By:_____ Date:

CONTRACTOR:

By:_____ Date:

DESIGN PROFESSIONAL:

By:_____ Date:

NOTICE: OWNER MUST RECEIVE A COPY WITH ALL ORIGINAL SIGNATURES.

FINAL CERTIFICATION OF COSTS
FOR CAPITAL ASSET ACCOUNTING

Date: _____

To: _____ (Owner)

The following accounting of costs for Project No. _____ , Project Name: _____

_____ at _____

is submitted as follows, with the breakdown of costs as specified in the Final Pay Request attached hereto and incorporated herein, for the purposes of capital asset accounting pursuant to GASB 34 Accounting Statements:

1. **BUILDING AND BUILDING IMPROVEMENTS: *** **$** _____
2. **INFRASTRUCTURE: **** **$** _____
3. **FURNISHINGS AND EQUIPMENT: ***** **$** _____

==========

TOTAL: **$** _____

Notes: (Contractor must insure costs from all Change Orders are apportioned and included in each line item above)
* ***Building:*** Include totals from Items A, 1, 3, 5, 6, 7, 8, 9, 10, 13, 14, 15 and "Building" portions of Items 2, 4, and 16.
** ***Infrastructure:*** Include totals from the "Infrastructure" portions of Items 2, 4 and 16.
*** ***Furnishing and Equipment*** : Include totals from only the "moveable" portions of Items 11 and 12.

I certify to the best of my knowledge and belief that all of the amounts set forth on this Certificate are true and correct and are supported by the financial records for this project on file with the Contractor.

Contractor_____ By: _____

Date_____ Title: _____

CERTIFICATE OF THE DESIGN PROFESSIONAL

I certify to the best of my knowledge, information and belief that the amounts certified by the Contractor are consistent with the estimates provided in my final Statement of Probable Cost for the Project; that the Building Improvement contains a footprint based upon a line 5 feet outside the building structure) of _____ square feet, a total of _____ gross square feet, and contains _____ floors (including basements). The building fire protection system is _____ (include type of system). The Certificate of Occupancy was issued on _____. I further certify that the design intent for this project is that the Building and Building Improvements are of Building Construction Class _____ and ISO Occupancy Type(s) _____ and have an expected useful life of _____ years from the date of this Certificate, and that my observations of the construction confirm these expectations. (*See* Exhibit J of Design Professional Contract.)

Name_____Design Professional. Date: _____

CERTIFICATE OF THE USING AGENCY OR OWNER

I certify that to the best of my knowledge, information, and belief that the cost of the real property covered by this project, to the boundaries on the final Site Plan, was $ _____and the cost of additional government-supplied furnishings and equipment acquired for this Project was $ _____
.

Name_____ Title: _____. Date: _____

SUPPLEMENTARY GENERAL CONDITIONS

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Project information.
2. Work covered by Contract Documents.
3. Work by Owner.
4. Work under Separate Contracts.
5. Access to site.
6. Coordination with occupants.
7. Work restrictions.
8. Specification and drawing conventions.

B. Related Section:

1. Section 23 09 00 "Instrumentation and Control for HVAC".

1.3 PROJECT INFORMATION

A. Project Identification: HVAC Controls Project.

1. Project Location: 650 College Dr., Dalton, Georgia 30720.

B. Owner: Dalton State College.

1. Owner's Representative: Mr. Scott Bailey, Phone No. – 706-272-4480.

C. Engineer: Leppard Johnson and Associates; 100 Crescent Centre Parkway, Suite 750, Tucker, GA 30084.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of the Project is defined by the Contract Documents (Drawings and Specifications) and consists of the following:

1. Westcott Administration Building – The facility is an existing one-story building, encompassing approximately 17,500 square feet of conditioned space. The scope of

work is to install a new Direct Digital Control (DDC) System to replace the existing HVAC Control System.

2. Bandy Gym Building – The facility is an existing two-story building, encompassing approximately 22,500 square feet of conditioned space. The scope of work is to install a new Direct Digital Control (DDC) System to replace the existing HVAC Control System.

3. Roberts Library Building – The facility is an existing two-story building, encompassing approximately 58,000 square feet of conditioned space. The scope of work is to install a new Direct Digital Control (DDC) System to replace the existing HVAC Control System.

4. Front-End System – This project will encompass provision and installation of new hardware and software to provide a central DDC control system, to be integrated with a campus-wide HVAC Control Network.

B. Type of Contract

1. Project will be constructed under a single prime contract.

1.5 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner. Refer to drawings for work related to this project that will be performed by the Owner.

1.6 USE OF SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated by requirements of this Section and agreed with the Owner.

B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is required.

1. Limits: Confine construction operations to areas of work as shown on the drawings
2. Driveways, Walkways and Entrances: Keep driveways parking garage, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

   a. Schedule deliveries at times agreed to by Owner.
   b. Schedule deliveries to minimize use of driveways and entrances by construction operations.
   c. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations to “like-new” condition.

1.7 COORDINATION WITH OCCUPANTS

A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
2. Notify the Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.8 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7 a.m. to 7 p.m., Monday through Friday, subject to Owner confirmation.

1. Weekend Hours: As agreed to by Owner to allow required activities.
2. Early Morning Hours: As agreed to by Owner to allow required activities.
3. Hours for Utility Shutdowns: As agreed to by Owner to allow required activities.
4. Hours for noisy operations shall be as agreed to by Owner to allow required activities.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Owner not less than five (5) working days in advance of proposed utility interruptions.
2. Obtain Owner's written permission before proceeding with utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify Owner not less than five (5) working days in advance of proposed disruptive operations.
2. Obtain Owner's written permission before proceeding with disruptive operations.

E. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor air intakes.

F. Controlled Substances: Use of tobacco products and other controlled substances within the existing building is not permitted.

G. Employee Identification: Owner will provide identification tags for Contractor personnel working on the Project site. Require personnel to utilize identification tags at all times.

H. Employee Screening: Comply with Owner's requirements regarding drug and background screening of Contractor personnel working on the Project site.

1. Maintain list of approved screened personnel with Owner's Representative.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on the Drawings are described in detail in the Specifications. One or more of the following are used on the Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.

1.10 MISCELLANEOUS PROVISIONS

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Sections:

1. Division 01 Section "Allowances" for products selected under an allowance.
2. Division 01 Section "Alternates" for products selected under an alternate.
3. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
4. Divisions 02 through 49 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use CSI Form 13.1A.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project.
j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Owner’s Action: If necessary, Owner will request additional information or documentation for evaluation within 10 days of receipt of a request for substitution. Owner will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Owner’s Supplemental Instructions for minor changes in the Work.
b. Use product specified if Owner does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Owner will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Owner will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 25 00

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and other Specification Sections apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Sections:

1. Division 01 Section "Substitution Procedures" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Engineer will issue, through the Owner, supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Owner may issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request or 7 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and

finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

e. Quotation Form: Use CSI Form 13.6B "Proposal Worksheet Summary" and 13.6C "Proposal Worksheet Detail".

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to the Owner.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use CSI Form 13.6A "Change Order Request (Proposal)" with attachments CSI Form 13.6B "Proposal Worksheet Summary" and 13.6C "Proposal Worksheet Detail".

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Engineer will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Engineer may issue a Construction Change Directive Document on AIA G701. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 00

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Terms and Conditions and other Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General project coordination procedures.
2. Administrative and supervisory personnel.
3. Requests for Information (RFIs).
4. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

1.3 DEFINITIONS

A. RFI: Request from Owner, Engineer, or Contractor seeking information from each other during construction.

1.4 COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Coordinate activities with Owner for continuous use of facility and work by Owner under separate contract. Refer to Division 1 section “Summary” for additional requirements.

C. Coordinate activities and construction schedule with HVAC Upgrade Contractor in separate contract with Owner.

D. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

E. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

F. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Pre-installation conferences.
7. Startup and adjustment of systems.
8. Project closeout activities.

G. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 KEY PERSONNEL

A. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide

names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Engineer.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: AIA Document G716 or a software-generated form with substantially the same content as indicated above, acceptable to Engineer.

D. Engineer’s Action: Engineer will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Engineer after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:

    a. Requests for approval of submittals.

b. Requests for approval of substitutions.
c. Requests for coordination information already indicated in the Contract Documents.
d. Requests for adjustments in the Contract Time or the Contract Sum.
e. Requests for interpretation of Architect's actions on submittals.
f. Incomplete RFIs or inaccurately prepared RFIs.

2. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt of additional information.
3. Engineer's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal.

a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within 10 days of receipt of the RFI response.

E. On receipt of Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer within seven days if Contractor disagrees with response.

F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly, if revised. Software log with not less than the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Engineer.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date Engineer response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.7 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Engineer of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, and Engineer, within five days of the meeting.

B. Preconstruction Conference: Owner will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Engineer, but no later than 15 days after execution of the Agreement.

1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of Owner and Engineer; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Tentative construction schedule.
    b. Phasing.
    c. Critical work sequencing and long-lead items.
    d. Designation of key personnel and their duties.
    e. Lines of communications.
    f. Procedures for processing field decisions and Change Orders.
    g. Procedures for RFIs.
    h. Procedures for testing and inspecting.
    i. Procedures for processing Applications for Payment.
    j. Distribution of the Contract Documents.
    k. Submittal procedures.
    l. Preparation of record documents.
    m. Use of the premises and existing building.
    n. Work restrictions.
    o. Working hours.
    p. Owner's occupancy requirements.
    q. Responsibility for temporary facilities and controls.
    r. Procedures for moisture and mold control.
    s. Procedures for disruptions and shutdowns.
    t. Construction waste management and recycling.
    u. Parking availability.
    v. Office, work, and storage areas.
    w. Equipment deliveries and priorities.
    x. First aid.
    y. Security.
    z. Progress cleaning.

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Engineer and Owner of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.
    e. Purchases.
    f. Deliveries.
    g. Submittals.
    h. Possible conflicts.
    i. Time schedules.
    j. Weather limitations.
    k. Manufacturer's written recommendations.
    l. Warranty requirements.
    m. Space and access limitations.
    n. Regulations of authorities having jurisdiction.
    o. Testing and inspecting requirements.
    p. Installation procedures.
    q. Coordination with other work.
    r. Required performance results.
    s. Protection of adjacent work.
    t. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at biweekly intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Engineer, contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Progress cleaning.
10) Quality and work standards.
11) Status of correction of deficient items.
12) Field observations.
13) Status of RFIs.
14) Status of proposal requests.
15) Pending changes.
16) Status of Change Orders.
17) Pending claims and disputes.
18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

E. Project Closeout Conference: Schedule and conduct a Project closeout conference, at a time convenient to Owner and Engineer, but no later than 60 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Engineer; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

a. Preparation of record documents.
b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
c. Submittal of written warranties.
d. Requirements for preparing sustainable design documentation.
e. Requirements for preparing operations and maintenance data.
f. Requirements for demonstration and training.

g. Preparation of Contractor's punch list.
h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
i. Submittal procedures.
j. Coordination of separate contracts.
k. Owner's partial occupancy requirements.
l. Installation of Owner's furniture, fixtures, and equipment.
m. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Terms and Conditions and other Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's construction schedule.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by Engineer.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration. Event: The starting or ending point of an activity.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Two (2) paper copies, plus the number of copies that the Contractor requires to be returned.

B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

C. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date and late finish date.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Earnings Report: Compilation of Contractor's total earnings from commencement of the Work until most recent Application for Payment.

D. Daily Construction Reports: Submit at weekly intervals.

E. Material Location Reports: Submit at weekly intervals.

F. Field Condition Reports: Submit at time of discovery of differing conditions.

G. Special Reports: Submit at time of unusual event.

1.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than twenty (20) days, unless specifically allowed by Engineer.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

    a. Delivery of control panels.
    b. Delivery of actuators.
    c. Delivery of control valves.

3. Submittal Review Time: Include review and re-submittal in the schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
4. Startup and Testing Time: Include not less than five (5) days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Engineer’s administrative procedures necessary for certification of Substantial Completion.
6. Punch List and Final Completion: Include not more than thirty (30) days for punch list and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Products Ordered in Advance: Include a separate activity for each product. Include delivery date for major equipment required to complete the Work. Delivery dates indicated stipulate the earliest possible delivery date.
2. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Limitations of continued occupancies.
    c. Uninterruptible services.
    d. Use of premises restrictions.
    e. Environmental control.

3. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

    a. Subcontract awards.
    b. Submittals.
    c. Purchases.
    d. Fabrication.
    e. Sample testing.
    f. Deliveries.
    g. Installation.

h. Tests and inspections.
i. Adjusting.
j. Startup and placement into final use and operation.

4. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

a. Completion of mechanical installation.
b. Completion of electrical installation.
c. Completion of structural installation.
d. Substantial Completion.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.

E. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.

1. Refer to Payment Procedures for cost reporting and payment procedures provided by owner.

F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered RFIs.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.

G. Recovery Schedule: When periodic update indicates the Work is fourteen 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

1. Utilize Microsoft Project, for Windows XP operating system.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule two (2) days before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Engineer Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01 32 00

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Terms and Conditions and other Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Sections:

1. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
2. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
3. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
4. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Engineer’s responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals.

B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer’s responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as informational submittals.

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Engineer's and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with start-up construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Engineer's Digital Data Files: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Engineer for Contractor's use in preparing submittals.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.

D. Identification and Information: Place a permanent label or title block on each paper copy submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.
3. Include the following information for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name of Engineer.
    d. Name of Contractor.
    e. Name of subcontractor.
    f. Name of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.

        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).

    i. Number and title of appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Location(s) where product is to be installed, as appropriate.
    l. Other necessary identification.

E. Identification and Information: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

    a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Engineer.
4. Include the following information on an inserted cover sheet:

    a. Project name.
    b. Date.
    c. Name and address of Engineer.
    d. Name of Construction Manager.
    e. Name of Contractor.
    f. Name of firm or entity that prepared submittal.
    g. Name of subcontractor.

h. Name of supplier.
i. Name of manufacturer.
j. Number and title of appropriate Specification Section.
k. Drawing number and detail references, as appropriate.
l. Location(s) where product is to be installed, as appropriate.
m. Related physical samples submitted directly.

5. Other necessary identification. Include the following information as keywords in the electronic file metadata:

a. Project name.
b. Number and title of appropriate Specification Section.
c. Manufacturer name.
d. Product name.

F. Options: Identify options requiring selection by the Architect.

G. Deviations: Identify deviations from the Contract Documents on submittals.

H. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Engineer observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

I. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer will return submittals, without review, received from sources other than Contractor.

1. Transmittal Form: Use AIA Document G810.
2. Transmittal Form: Provide locations on form for the following information:

a. Project name.
b. Date.
c. Destination (To:).
d. Source (From:).
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Specification Section number and title.
i. Indication of full or partial submittal.
j. Drawing number and detail references, as appropriate.
k. Transmittal number.
l. Submittal and transmittal distribution record.
m. Remarks.
n. Signature of transmitter.

3. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

J. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.

K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

L. Use for Construction: Use only final submittals that are marked with approval notation from Engineer's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Submittals **MUST** be project specific.
2. Action Submittals: Submit a minimum of three (3) paper copies of each submittal, unless otherwise indicated. Engineer will return copies not retained as record copies by Engineer and/or Subconsultants.
3. Informational Submittals: Submit two (2) paper copies of each submittal, unless otherwise indicated. Engineer will not return copies.
4. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
5. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

    a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.
    b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's catalog cuts.
b. Manufacturer's product specifications.
c. Standard color charts.
d. Statement of compliance with specified referenced standards.
e. Testing by recognized testing agency.
f. Application of testing agency labels and seals.
g. Notation of coordination requirements.
h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

a. Wiring diagrams showing factory-installed wiring.
b. Printed performance curves.
c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:

a. A minimum of four (4) paper copies of Product Data, unless otherwise indicated. Engineer will return copies not retained as record copies by Engineer and/or Subconsultants.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 11 by 17 inches but no larger than 30 by 42 inches.
3. Submit Shop Drawings in the following format:

a. Four (4) opaque copies of each submittal. Engineer will retain one (1) copy; remainder will be returned.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.
5. Submit product schedule in the following format:

    a. A minimum of four (4) paper copies of product schedule or list, unless otherwise indicated. Engineer will return copies not retained as record copies by Engineer and/or Subconsultants.

E. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

F. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.

G. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of engineers and owners, and other information specified. Provide qualifications for crane operator, helicopter pilot and other heavy equipment operators who will perform on site. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

H. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

I. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

J. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

K. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."

L. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

M. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads.

Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

N. Test Reports: Submit written product test reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency. Submit test reports were required by other sections of this specification.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.

B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01 Section "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ENGINEER'S ACTION

A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

1. No Exceptions Taken
2. Make Corrections Noted
3. Amend and Resubmit
4. Rejected – See Remarks
5. Not Reviewed

C. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.

D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Engineer.

E. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

F. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01 33 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

A. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

B. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

PART 2 - EXECUTION

2.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

2.2 SUPPORT FACILITIES INSTALLATION

A. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

B. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

C. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

D. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

2.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

C. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

D. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

2.4 OPERATION, TERMINATION, AND REMOVAL

A. Termination and Removal: Remove each temporary facility when need for its service has ended, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Terms and Conditions and other Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Sections:

1. Division 01 Section "Substitution Procedures" for requests for substitutions.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

A. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on

product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. Refer to Divisions 02 through 49. Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved."

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.

Comparable products or substitutions for Contractor's convenience will not be considered.

3. Products:

   a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered, unless otherwise indicated.

4. Manufacturers:

   a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

B. Related Requirements:

1. Section 011000 "Summary" for limits on use of Project site.
2. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.2 INFORMATIONAL SUBMITTALS

A. None Required.

1.3 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Engineer of locations and details of cutting and await directions from Engineer before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in

reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before

fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
5. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
3. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
4. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements"

3.7 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Terms and Conditions and other Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.

B. Related Sections:

1. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
2. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
3. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
4. Divisions 02 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete with request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.

6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements.

Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Engineer.
    d. Name of Contractor.
    e. Page number.

4. Submit list of incomplete items in the following format:

    a. Three (3) paper copies of product schedule or list, unless otherwise indicated. Engineer will return two (2) copies.

1.6 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide table of contents at beginning of document.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that meet Green Seal GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove debris and surface dust from limited access spaces, including roofs and similar spaces.
f. Sweep concrete floors broom clean in unoccupied spaces.
g. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
h. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Remove labels that are not permanent.
i. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.

j. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

END OF SECTION 01 77 00

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Operation manuals for systems, subsystems, and equipment.
3. Product maintenance manuals.
4. Systems and equipment maintenance manuals.

B. Related Sections:

1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Divisions 02 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

A. Manual Content: Operations and maintenance manual content is specified in individual specification sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Where applicable, clarify and update reviewed manual content to correspond to modifications and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:

1. Three (3) paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves.

C. Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least fifteen (15) days before commencing demonstration and training. Engineer will return copy with comments.

1. Correct or modify each manual to comply with Engineer's comments. Submit copies of each corrected manual within fifteen (15) days of receipt of Engineer's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS FOR OPERATION, AND MAINTENANCE MANUALS

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Engineer.
7. Names and contact information for major consultants to the Engineer that designed the systems contained in the manuals.
8. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

    a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in

manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

2.4 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared record Drawings in Division 01 Section "Project Record Documents."

F. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 78 23

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Sections:

1. Division 01 Section "Closeout Procedures" for general closeout procedures.
2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
3. Divisions 02 through 49 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit two sets of marked-up record prints.
2. Number of Copies: Submit copies of record Drawings as follows:

a. Initial Submittal: Submit one paper copy set of marked-up record prints and one set of plots from corrected record digital data files. Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
b. Final Submittal: Submit two paper copy sets and PDF electronic files of marked-up record prints. Print each Drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit one paper copy and annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one paper copy and annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding archive photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Revisions to routing of piping and conduits.
d. Revisions to electrical circuitry.
e. Actual equipment locations.
f. Duct size and routing.
g. Changes made by Change Order or Construction Change Directive.
h. Changes made following Engineeer's written orders.
i. Details not on the original Contract Drawings.
j. Field records for variable and concealed conditions.
k. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.

4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Engineer. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: DWG, Version Autocad 2007.1, operating in Microsoft Windows operating system.
2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Engineer for resolution.
4. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.

    a. Refer to Division 01 Section "Submittal Procedures" for requirements related to use of Engineer's digital data files.
    b. Engineer will provide data file layer information. Record markups in separate layers.

C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.

1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
2. Consult Engineer for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

D. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:

    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."

d. Name of Engineer.
e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders**,** record and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file and one paper copy.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

B. Format: Submit record Product Data as annotated PDF electronic file and one paper copy.

1. Include record Product Data directory organized by specification section number and title, electronically linked to each item of record Product Data.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file and one paper copy.

1. Include miscellaneous record submittals directory organized by specification section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Engineer's reference during normal working hours.

END OF SECTION 01 78 39

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Terms and Conditions and other Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and training video recordings.

B. Related Sections:

1. Divisions 23 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules utilizing manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Attendance Record: For each training module, submit list of participants and length of instruction time.

C. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit four copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

    a. Name of Project.
    b. Name and address of videographer.
    c. Name of Engineer.
    d. Name of Contractor.
    e. Date of video recording.

2. Transcript: Prepared on 8-1/2-by-11-inch paper, punched and bound in heavy-duty, three-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
3. At completion of training, submit complete training manual(s) for Owner's use.

1.5 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.

D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.
2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.6 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Engineer.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Operations manuals.
    c. Maintenance manuals.
    d. Project record documents.
    e. Identification systems.
    f. Warranties and bonds.
    g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

a. Startup procedures.
b. Equipment or system break-in procedures.
c. Routine and normal operating instructions.
d. Regulation and control procedures.
e. Control sequences.
f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner with at least ten days' advance notice.

B. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

C. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Video Recording Format: Provide high-quality color video recordings with menu navigation in format acceptable to Architect.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.

D. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.

E. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

F. Pre-Produced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION 01 79 00

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 INFORMATIONAL SUBMITTALS

A. Predemolition Photographs or Video: Submit before Work begins.

B. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician.

1.4 CLOSEOUT SUBMITTALS

A. None Required.

1.5 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

B. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs and videotapes.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

1. Comply with requirements for existing services/systems interruptions specified in Section 011000 "Summary."

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
2. Disconnect, demolish, and remove plumbing and HVAC systems, equipment, and components indicated to be removed.

a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
5. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Transport items to storage area designated by Owner.
4. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition, cleaned, and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 23 09 00 - INSTRUMENTATION AND CONTROL FOR HVAC

PART 1 - GENERAL

1.1 DESCRIPTION

A. FMS Contractor shall provide and install a new networked Facility Management System (FMS)

1. Fully integrated Facility Management System (FMS), for control of the existing building HVAC equipment for the Westcott Administration building, Bandy Gymnasium and Roberts Library. New controls shall replace the existing controls and shall provide direct digital control (DDC) for energy management, equipment monitoring and control, including subsystems with open communications as herein specified.
2. Complete replacement of the existing control systems for HVAC systems with new control systems, which shall be DDC with electric actuation as specified herein.
3. The Contractor shall provide a completely new FMS control system including all required power and control wiring, conduit, panels, control sensors, actuators and all accessories required for completely operational replacement building HVAC control systems
4. The Contractor shall provide a new LNS network.
5. A new work station shall be provided and installed in the existing maintenance office building
6. A notebook computer and shall be provided by the Contractor set-up for secure, fully functional, remote access to FMS network.
7. The Contractor shall provide new connections at each building named above to the existing fiber optic campus wide network infrastructure.
8. The existing campus wide network infrastructure shall be extended to new connection locations in the Westcott Administration building, Bandy Gymnasium, Roberts Library and Maintenance Building.
9. New control devices and equipment shall be LonMark certified, when available and the campus network shall be LNS.
10. FMS Contractor shall be responsible for all line and control voltage electrical work associated with the new FMS installation.

    a. Perform all wiring in accordance with all local and national codes.
    b. Install all line voltage wiring, concealed or exposed, in conduit in accordance with the electrical specifications, NEC and local building code.
    c. Surge transient protection shall be incorporated in the system design to protect all electrical FMS components and operator’s workstations.
    d. All low voltage electrical control wiring throughout the building, whether exposed or concealed, shall be run in conduit in accordance with the electrical specifications, local building code and the NEC.
    e. Provide all miscellaneous field device mounting and interconnecting wiring for all mechanical systems including, but not limited to chillers, pumps, air conditioning units, condensing units, filtration systems, hot water heaters, cooling towers and chiller control systems.

f. All systems requiring interlock wiring shall be hardwired interlocked and shall not rely on the FMS to operate. Interlock wiring shall be run in separate conduits from FMS associated wiring.
g. Provide open communications systems. The systems shall be an open architecture with the capabilities to support a multi-vendor environment. To accomplish this effectively, systems shall be capable of utilizing standard protocols as follows, as well as be able to integrate third-party systems via existing vendor protocols. Systems shall be capable of high speed Ethernet communication using TCP/IP protocol.
h. Systems shall be capable of LonMark/LonTalk communication.
i. New building management systems shall communicate over a new campus LNS network to a new work station and remote laptop computer, which are all part of this work.

11. Provide system interactive graphics for each controlled device and integrated systems. Origin of information shall be transparent to the operator and shall be controlled, displayed, trended, etc. as if the points were hardwired to the workstation.
12. The Owner shall be the named license holder of all software associated with any and all incremental work on the project.
13. The Owner shall be provided with all system required passwords, including highest level(s), at time of system training.

1.2 WORK INCLUDED

A. This section defines the Basic Materials and Methods that shall be provided by the FMS Contractor and used in the installation of network control products to provide the functions necessary for control of the various systems on this project. The requirements of this specification will be strictly enforced. Systems that do not meet the requirements of this specification as outlined below will not be accepted.

B. The control system shall utilize an open,industry standard networking communication protocol and network management system to provide direct access to each device. All messaging on the system shall provide direct peer-to-peer communication capability and provide for device level interoperability. The system shall implement a logical flat, physically tiered architecture model in order to ensure interoperability and remove any closed system elements.

C. No closed network communication elements will be allowed and will be strictly enforced. No non-open communication to devices from network tools, host interfaces, or enterprise level applications will be permitted.

D. All data flow on the network shall be fully published and documented. No vendor specific closed communication will be allowed.

E. The system shall consist of interoperable devices, standard routers, standard network interfaces, standard IP communications and open user interfaces. No closed system components will be permitted including custom gateways (unless expressly defined below), logically tiered hardware or software architecture elements, or closed system tools.

F. All systems and subsystems shall be capable of being serviced and maintained internally or by a third party service organization. Under no circumstances shall any hardware or software be implemented such that the property will not be able to provide access to a service organization of our choice.

G. The Contractor shall supply all hardware, software, databases, configuration tools, commissioning tools, analysis tools, and software plugins on this project to the Owner. All tools shall be properly licensed and conveyed. All original software, software keys, and licenses shall be conveyed such that the Owner shall have full access and usage rights to all components.

H. The Contractor shall follow all industry standards and relevant guidelines for the control network, device selection, network wiring, configuration, and commissioning.

I. This project may be part of a multi-phase project and, as such, nothing delivered shall force the Owner to require contracting to the original Contractor for future phase work. All elements of the control system shall be delivered such that any alternate Contractor will be able to add, modify, or enhance the existing system without the need for the original Contractor.

J. All hardware supplied shall be available for purchase directly by the Owner or the Owner's agent at industry completive pricing for future spare parts. The Owner shall have the right to purchase spare parts at any time directly from the Contractor or the Contractor's assigned agent without the need for any future integration contract.

K. The Contractor shall demonstrate their ability and intent to fully complete this project as specified. No alternate bids or exceptions will be accepted. The Contractor shall demonstrate their knowledge, ability, and experience in providing the system as specified.

L. Control Devices

1. Communications media

   a. Transformer isolation – all devices shall be isolated from the network using a transformer isolated transceiver capable of common mode rejection to ensure network reliability and that a power surge on the communication buss will not take down the entire network.
   b. All devices shall implement polarity insensitive transceivers in order to reduce miss-wiring.
   c. Devices using twisted pair wiring shall operate at the same bit rate, minimum of 78Kbps, to ensure interoperable device to device communication.

2. Communication protocol

   a. International Standard Protocol - Devices shall utilize a common ISO/IEC listed open communication protocol. All devices on the network shall implement the full protocol stack. No partial or limited protocol stack implementations will be accepted in order to ensure reliable full communication between devices, improve installation time, and reduce field engineering.

3. Network security

    a. all devices shall implement a native communication security mechanism such as device authentication at the device level to prevent unauthorized access on the network.
    b. All devices shall implement peer-to-peer communication protocol. No master slave protocol implementations will be acceptable. Reduce single point of failure.

4. Device Network Management

    a. All devices shall be configurable via an open network management tool. No explicit addressing will be allowed in order to prevent proprietary devices being installed on the open network.
    b. Devices shall not implement the use of DIP switches for network addressing in order to prevent miss-addressing.
    c. All devices shall include a unique physical node address stored on non- volatile memory on the device to prevent the possibility of two devices having the same address and causing network communication problems.
    d. All complex devices shall be delivered with a device software configuration plugin capable of being run from any standard network management tool. No proprietary configuration communication mechanisms will be allowed. Plugin software shall be supplied for each device. A backup of all plugin software for each device shall be provided on optical media.
    e. All devices shall be capable of identifying themselves via a visual indicator if requested to by a network management or commissioning tool.
    f. All devices configuration and applications shall be able to be updated over the network. In no cases shall a device have to be physically removed from the network in order to be updated with new software or configuration.

5. Programming of Devices

    a. Programmable devices shall be programmed with an openly available programming tool.
    b. Device programming tools shall be fully licensed and conveyed at contract sign off.
    c. Programmable devices shall follow open standard interoperability guidelines. No closed or proprietary interfaces to programmable devices will be allowed.
    d. Once programmed a programmable device shall interoperate as any other application specific device on the network. No closed or proprietary communication to programmable devices will be allowed.
    e. Field programmability of devices must be provided.
    f. Device programming tools shall be able to run on the
    g. Operator Workstation (see Operator Workstation Computer requirements)
    h. A laptop computer shall be provided to the Owner preloaded with all software and hardware required for remote access to the network with the ability to view and cancel alarms, view logs, graphics and with the ability to view and change set points, view and change or override equipment operation schedules.

M. System Infrastructure

1. Wiring

    a. The network infrastructure shall consist of a two wire, polarity insensitive twisted pair network. All devices shall connect directly to the twisted pair network as peers. No home run wiring will be acceptable.
    b. Wiring capable of bus, start or loop wiring with single termination when wired in a "free wiring" setup. Bus wiring may be used to extend the length of the network where appropriate. Double termination is required if bus networking is used in order to improve network communication reliability
    c. Network wiring shall consist of a twisted pair, unshielded, polarity insensitive structure such that wiring issues are minimized.
    d. Wiring lengths shall conform to the industry published guidelines with a minimum of 20% headroom on each segment in order to allow for future network enhancements. Example: If the network wiring guidelines call for a maximum of 500 meters per segment, wiring shall consist of 20% less than 500 meters or a total of 400 meters.
    e. The maximum number of devices per wiring segment shall be 80% of the published maximum in order to provide for future expansion. Example: if the published wiring guidelines allow for 64 devices per segment, the maximum allow will be 80% of 64 or 51 devices maximum.

1. Connectivity

    a. Network segments shall be connected by a standard layer-3
    b. transparent router. No gateways or application specific routers will be permitted to reduce the engineering customization and proprietary hardware interfaces.
    c. Logical network routers shall have the capability of forwarding and blocking messages relevant for each segment of the network in order to maximize network traffic capabilities.
    d. A maximum of one (1) physical layer repeater is allowed per segment in order to extend the length of the segment. The maximum number of nodes on the segment shall not exceed the defined limits including future expansion limits.
    e. A network interface shall be provided at each connectivity point to a host computer. The network interface shall be configured in the same manner as any other device on the network. No Master/Slave interfaces are allowed to reduce the potential for single point of failure and heavy traffic loading.

N. Network Management

1. All devices on the network shall be installed by a single, common, network management tool.
2. Network management tools shall create one common network database for all devices within the domain (system). An accurate, up to date copy of the network management database shall be delivered on optical media at contract sign off.
3. The network management tool shall run on a Windows PC and be provided with the current software version. A fully licensed version of the software shall be conveyed at contract sign off including any license keys or software security. The software shall be the property of the Owner. All rights to use the software shall be properly conveyed to the Owner.

4. Provide a computer system according to the guidelines in this section which shall properly and fully run the network management software, store the network database, and provide full configuration capability of all devices on the network.
5. Complex devices shall be configured using a network management software plugin in order to improve the commissioning time of each device.

O. User Interfaces

1. Contractor shall provide an operator workstation and laptop computer running a current version of the Windows Operating Systems.
2. The operator workstation and laptop computer shall have the ability to monitor, control, diagnose, and display all data as defined in the Points List which are indicated as: Monitored, Controlled, Displayed, Trended, Alarmed, Override, or Reported.
3. An operator software package shall provide the ability to monitor, control, trend, alarm, and override points as defined in the Points List.
4. All host computer software shall be fully licensed. Software shall include original Optical Media of each application. All applications shall be property of the project Owner. All software keys, licenses, dongles, etc. shall be conveyed at contract sign off.
5. Host software shall not have a closed interface to any hardware. No explicitly addressed communication will be allowed. All communication to devices shall follow industry open standards. No vendor lock-in will be allowed.
6. The Contractor shall prove and verify that all host software to hardware communication is open and interoperable to the satisfaction of the Owner/engineer.

P. IP and Enterprise Connectivity

1. The control network shall interface and connect to the data network using industry standard interfaces. No proprietary closed interfaces will be allowed.
2. Data connections from the control network to the data network shall use standard protocol tunneling mechanisms to ensure data integrity. Protocol translators that modify the data values, ranges, resolutions, will not be accepted.
3. Contractor shall supply all necessary data network elements needed to ensure a fully functioning system including tunneling routers, network interfaces, firewalls, switches, IP routers.
4. Contractor shall interface with Owner’s IT department to define any and all IP needs for this system.
5. Connectivity to the enterprise network shall ensure data integrity, reliability, performance, and security. Contractor shall interface with Owner’s enterprise personnel to ensure system functionality. Details of the enterprise and data network requirements are defined in a separate section of this spec.

Q. Network Reliability

1. Provide a comprehensive analysis of all control networking capabilities showing that all communication is in acceptable ranges. Provide a network analysis summary for each channel for a typical 24 hour period during system full operation showing that all communication is within acceptable limits and that there are no network sizing issues, device communication issues, wiring issues, or bandwidth issues.

2. Deliver a fully licensed network analysis tool as part of the system with completed documentation and demonstration on its use.

R. Security

1. The system shall employ a high degree of network security in order to prevent tampering.
2. Control Network

   a. Each controller on the control network shall incorporate a network security algorithm at the protocol layers such as message authentication or message encryption.

   b. Devices with high degree of security shall have the option to have their security feature enabled. Other devices shall have the option to turn off their security process in order to improve system performance.

   c. The system detailed points list shall define which network communication elements shall employ the communication security.

3. Data Network

   a. The data network shall follow standard Ethernet TCP/IP security protocol options such as firewalls, ND5, HTTPS, secure socket layer and more. Refer to the data network requirements.

S. Service

1. Contractor shall provide service contract costing for 3 years after the end of the warranty as a separate cost. Service contract costs must be defined as an annual cost for full servicing. This cost shall be defined as an annual cost for years 1, 2 and 3 separate from the initial installation bid.

T. Serviceability

1. The Contractor shall provide a fully serviceable system with complete access to all system components, controllers, sensors, actuators, panels, wiring junction boxes. All elements of the system must be accessible by maintenance staff.
2. Ensure all cabinets, enclosures, and installations are accessible without hindrance. Provide all cabinet keys with clear indications to their location.
3. No Contractor or vendor proprietary service tools will be allowed. All service tools shall be included as part of this bid.

U. Training

1. Training shall be provided on the full operation of the control system.
2. Training shall be provided for all network management, commissioning tools, and network diagnostic and analysis tools.
3. Training shall be provided on the system architecture, basic protocol capabilities, and servicing of the system
4. Training shall be provided on all device configuration and programming tools

V. Integrator Qualifications

1. The network system integrator shall be Certified System Integrator according to published proficiency requirements and industry best practices. Integration Contractor shall provide a copy of their credentials.
2. The network system integrator shall employ at least two Certified Professionals. Provide the credentials of at least two employees who will be responsible for this project. Credentials shall demonstrate industry best practices for proficiency in the core networking technology provided and shall be up to date.
3. Provide training certificates from key personnel responsible for this project showing class taken and completion date.
4. Provide professional resumes for all key personnel responsible for this project.
5. Provide at least two similar prior job examples demonstrating a competent level of knowledge, proficiency, and experience.
6. Integrator shall be fully licensed to perform the intended work. Provide a copy of any and all relevant Contractor licenses.

W. System Functionality

1. Deliver a fully functioning, complete, serviceable system.
2. All devices shall be fully programmed and commissioned and all systems and subsystems shall be demonstrated to be fully operational.

1.3 DESCRIPTION

A. Provide a Facility Management System incorporating LonWorks, Direct Digital Control (DDC), equipment monitoring, and control consisting of microprocessor based plant control processors interfacing directly with sensors, actuators, and HVAC equipment electric controls and mechanical devices for all items indicated on drawings described herein including dampers, valves, panels, sensing devices; a primary communications network to allow data exchange between microprocessor based devices.

B. The system will consist of a flat, open architecture that utilizes the ANSI/CEA 709.1 (LonTalk™) Protocol as the common communication protocol between all controlled and controlling devices. Where necessary or desired, LonTalk packetsmay be encapsulated into TCP/IP messages to take advantage of existing infrastructure or to increase network bandwidth. Hierarchal systems consisting of master or global controllers that poll and/or control less intelligent unitary controllers on a secondary bus will not be considered.

C. The entire system network shall be a Local Operating Network (LON). All nodes shall communicate with each other utilizing ANSI/CEA 709. There will be no consideration given to any network which does not use LonWorks as the primary communications network. Controllers shall be capable of sharing standard network variable data with other LON-based devices.

D. Controllers shall implement the full ANSI/CEA 709.1 “LonTalk” protocol. Controllers must meet all of the requirements of this standard and must adhere to all of the protocol definition set forth by ANSI. All controllers shall be able to co- exist and interoperate on the LonWorks network

without interfering or limiting other controller's functionality. Controllers shall be able to be installed by any standard LonWorks Network Services (LNS) based network management tool.

E. The system installed shall seamlessly connect devices other than HVAC throughout the building regardless of subsystem type, i.e. HVAC, lighting, and security devices should easily coexist on the same network channel without the need for gateways. Use of ANSI/CEA-852 layer 3 transparent routers is the only acceptable method spanning multiple channels and is the recommended method for system scalability. These components shall share common software for network communications, configuration, time scheduling, alarm handling, history logging, and custom programming. Any routers required by the system shall be supplied and commissioned as part of this specification.

F. Gateways shall not be used unless specifically authorized in writing. Use of a gateway requires submittal of the documentation as required by the owner or Owner's representative. It is the intent of this specification that gateways be limited to integrating legacy systems where applicable. Acceptance of gateways is at the sole discretion of the Owner.

G. System Monitoring shall be provided through the installation of Graphical User Interface (GUI) software applications that support a direct driver to the LonWorks database or through web browser based devices. The GUI shall provide complete access to any point in the system at any time. A complete and fully commissioned LNS database must be delivered for use with the GUI as a specific deliverable as defined on the project schedule. This database must include ALL node definitions, ALL channel and subnet definitions, all router and repeater definitions, and all bindings etc.

H. The control system shall be designed such that mechanical equipment will be able to operate under stand-alone control. Functional methodology such as scheduling, trending, and alarming shall be outlined fully in your submittal documentation. Methodology must follow pertinent and applicable LonMark guidelines. Controllers that require a master computer or controller to perform basic functions are not acceptable. In the event of a network communication failure, or the loss of any other controller on the LON network, the control system shall continue to independently operate under control of the resident program stored in nonvolatile memory as detailed herein.

I. The documentation contained in this section and other contract documents pertaining to HVAC Controls is schematic in nature. The Contractor shall provide all required hardware and software necessary to implement the functions shown or as implied in the contract documents.

J. System configuration and monitoring will be performed via a PC-type computer. Under no circumstances shall the PC be used as a control device for the network. It can be used for storage of data, network management, and as a GUI. If the PC is taken off line, the control system shall continue to operate fully.

K. All LonWorks devices (controllers, sensors, actuators, etc) shall be integrated into one common network infrastructure utilizing a common network management tool and creating a single LNS network database.

L. All system controllers shall utilize a peer-to-peer communications scheme to communicate with each other and with the PC-type monitoring computer(s). All controllers shall utilize Standard

Network Variable Types (SNVTs) as defined by LonMark International. Controllers shall implement LonMark device profiles as appropriate. All devices shall be provided with an LNS plug-in configuration utility. If an LNS plug-in is not available for a device, all device resource files, XIF files, and points list shall be provided.

M. Controllers shall contain non-volatile memory for storage of control programs, configuration, and set points. All such data shall be retained in the event of a power failure. At least one controller shall have an on-board (battery or "super cap"-backed) real-time clock to ensure correct time-of-day operation following a power failure. Controllers that are not backed-up in the event of a power failure and that require time based operation (VAV's, heat pumps, etc..) shall be peers on the network and be able to obtain time synchronization from a power fail protected controller and/or controllers upon network power restore.

N. Historical data logging, alarm monitoring and management, and scheduling shall be accessible and managed via the GUI. The system may utilize specific controllers on the LON to perform these functions or it may be performed by a host computer, or a combination of both.

O. Controllers shall use a software mechanism for network addressing and identification. It shall not be required to set physical network address switches on each controller.

P. System shall utilize LonMark defined standard network and command messaging for all system data.

Q. In general, only LonMark certified devices will be accepted on this control network. Each device must be LonMark certified version [3.2] or higher. In those instances in which LonMark devices are not available, provide LonWorks devices with application source code, device resource files, and external interface definitions 2 weeks prior to bid date. Any controller that does not meet this spec must be stated and submitted with specific reason why it is not LonMark certified. LonMark compatible, LonMark compliant, LonMark "ish" controllers are not acceptable. Exceptions may be granted for programmable controllers utilizing a custom programming software tools. These programmable controllers must meet all LonMark requirements for interoperability and shall utilize standard variable and configuration properties (SNVTs, SCPTs) as defined by LonMark. Any custom software required for controller programming shall be included as a leave-behind tool with enough license capability built into the bid to support the installation.

R. If a dedicated configuration tool is provided it is preferable that it be launched from within the applicable Network Management Software. If not, any software required for controller configuration shall be included as a leave-behind tool with enough license capability to support the installation the Owner's needs.

S. The network infrastructure shall conform to the LonMark published guidelines for network wiring and system architecture. Wire type, distance, termination, and use of routers shall strictly conform to the LonMark wiring standards. The number of nodes per channel shall be no more than 80% of the defined segment (logical or physical) limit in order to provide future system enhancement with minimal infrastructure modifications. See reference to the Junction Box and Wiring Guidelines.

T. Upon job completion provide all drawings, product information, complete and functional LNS databases, resource files, configuration files, etc on standard recordable media (CD, DVD).

U. The Contractor shall provide the appropriate quantity of legal copies of all software tools, configuration tools, management tools, and utilities used during system commissioning and installation. All tools shall be generally available in the market. No closed and/or unavailable tools will be permitted. Contractor shall convey all software tools and their legal licenses at project close out.

V. Provide LonWorks based products that communicate on multiple channels to meet the functional specifications as indicated on the Drawings and the dedicated product functional specifications and profiles specified in other Sections.

W. Provide FTT-10A LonTalk routers and repeaters as required to combine different communication channels onto a central field bus or as required to segment groups of Intelligent Devices and/or Control Units.

X. Provide Intelligent Control Devices, Programmable Controllers, and Application Specific Controllers as herein specified, as needed to perform functions indicated in the input/output summaries and sequences of operation, and/or indicated on the HVAC drawings.

Y. Provide wire, raceway systems, 24 VDC and/or 24 VAC power supplies and final connections to nodes provided by this contract. Must comply with Division 26 requirements.

Z. The Contractor shall provide all controls and sequence of operations as required by these specifications and by the drawings. Provide all required devices, sensors, hardware, software, wiring, controllers, etc. Provide all required devices, sensors, hardware, software, wiring, controllers, etc. including any required and not specifically addressed in this specification but required for system functionality. It shall be the responsibility of the Contractor to provide a complete and functional system.

AA. The system shall have the capability for future integration of other systems such as Card Access, Lighting, Intrusion Monitoring etc. on the FMS provided by the Contractor and also share a common infrastructure for network communications, time scheduling, alarm handling, history logging, monitoring and system control.

BB. Provide the services of various engineering disciplines, both in the field and in the home office in order to complete the work in a satisfactory and professional manner, within the project schedule time frame.

CC. Provide technical direction of the installation as specified herein.

DD. Provide field calibration, testing and commissioning of equipment as specified herein.

EE. Incorporate Uninterruptible Power Supply surge transient protection in the installation of the system to protect electrical components in all LonWorks controllers, remote controllers, and operator's workstations.

FF. Provide submittals, software, data entry facilities Portable Operator’s Terminal (POT), programming, startup, test and validation, training of the Custodian and Maintenance Representative on maintenance and operation, as built documentation and system warranty.

GG. Provide special tools, testing equipment as required for operation, installation, and maintenance of the equipment specified herein.

HH. Provide data communication wiring and connections between LonWorks controllers and RC controllers and DDC controllers.

II. Provide documentation and complete Operating and Maintenance Manuals.

JJ. Provide start-up and system commissioning.

KK. Provide accurate and current LNS Database of the control network to Architect/Engineer of Record. Any changes on made on the network shall be incorporated into the LNS database and an updated database shall be provided ensuring the Architect/Engineer of Record always has the correct and current database for the control system.

LL. Provide documentation on all point naming conventions to the Architect/Engineer of Record/ for incorporation into the graphical user interface (GUI).

MM. Provide a CD backup of the LNS database upon ANY changes or updates to the database.

NN. The network infrastructure shall conform to the published guidelines for wire type, length, number of nodes per channel, termination, and other relevant wiring and infrastructure criteria as published (reference: Junction Box and Wiring Guidelines for Twisted Pair LonWorks Networks).

OO. Any host PC GUI shall use openly available software packages that are nonexclusive. No closed software will be accepted. Software must be generally available on the market from multiple sources.

PP. Contractor shall provide references of prior successful experience.

QQ. Contractor must demonstrate ability and intent to design, engineer, and install an open, logically flat, LonWorks system.

RR. No exclusive or non-open integration tools, devices, or host software shall be used as part of this open system.

SS. Where Internet or IP connectivity is required, all devices connecting to the LAN shall use the TCP/IP protocol stack. Any LAN to LonWorks routers shall use the ANSI/CEA-852 standard layer 3 transparent routing protocol. Specific IP interconnectivity shall follow IT standards for security, firewalls, address, etc. published in separate documents, when such standards are available.

TT. The control system shall be installed using the best available products from the currently available suppliers that meet the system specification. Controllers from multiple manufactures are acceptable.

UU. The system integrator shall provide a protocol analyzer log summary for each channel for a minimum of 24 hours showing system performance. The statistical summary shall show that all

bandwidth utilization and error limits are within acceptable ranges and that there are no network traffic problems, node communication problems, or system sizing problems.

1.4 REFERENCES

A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

B. Perform the work in accordance with the requirements of Division 23 and Division 26 sections, and with the provisions of all applicable codes and laws.

C. The installation and equipment is to conform to all applicable building and electrical code articles and reference standards cited therein.

1.5 QUALITY ASSURANCE

A. The FMS Contractor shall be furnished, engineered, and installed by Licensed Trade Technicians. The Contractor shall have on staff trained LonWorks Network Integrators. Training shall include a minimum of 40 hours of LonWorks Network Design and LonWorks Network Management tool training. Contractor must have at least two fully trained staff members at all times. Contractor shall provide training class certifications of staff members. Contractor shall have a direct line of technical support from suppliers. The Contractor shall employ technicians who have completed factory-authorized training. The Contractor shall employ technicians to provide instruction, routine maintenance, and emergency service within 24 hours upon receipt of request.

B. Contractor Qualifications

1. The Contractor must be regularly engaged in the service and installation of LonWorks based systems as specified herein, and must have been so for a minimum of ten (10) years.
2. The Contractor must be an authorized representative in good standing of the manufacturer of the proposed hardware and software components.
3. The Contractor shall have an office that is staffed with designers trained in integrating interoperable systems and technicians fully capable of providing LonWorks instruction and routine emergency maintenance service on all system components.
4. The Contractor shall have in house capabilities to provide control strategies for whole building control. This includes HVAC, lighting, access, and security applications etc.
5. The Contractor shall have a service facility, staffed with qualified service personnel, capable of providing instructions and routine emergency maintenance service for networked control systems.
6. The Contractor shall submit a list of no less than three (3) similar projects, which have LonWorks based FAS as specified herein installed by the Contractor. These projects must be on-line and functional such that they can be observed the system in full operation.
7. The Contractor must be a certified LonWorks Integrator and shall submit resumes with the proposal indicating passing certificates as proof of approved training. Such proof must

include summary of coursework and indicate both written and laboratory requirements of training. Certificates of training completion shall be for currently active employees.

1.6 MANUFACTURER QUALIFICATIONS

A. The manufacturer(s) of the hardware and software components must be primarily engaged in the manufacture of LonWorks based systems as specified herein, and must have been so for a minimum of five (5) years.

B. The manufacturer(s) of the hardware and software components as well as its subsidiaries must be a member in good standing of LonMark International and/or LonMark Americas.

C. The manufacturer(s) of the hardware and software components shall have an authorized representative capable of providing service and support as referenced in section 1.4 above, and must have done so for a minimum of five (5) years.

D. The manufacturer(s) of the hardware and software components shall have a technical support group accessible via a phone/fax/email that is staffed with qualified personnel, capable of providing instruction and technical support service for networked control systems.

E. The manufacturer(s) of the hardware and software components must have no less than three (3) similar projects, which have LonWorks based Facility Management Systems as specified herein installed by the authorized representative referenced above. These projects must be on-line and functional such that the Owners/Users representative can observe the system in full operation.

1.7 ACCEPTABLE MANUFACTURERS OF THE HARDWARE AND SOFTWARE

A. Products of Manufacturers' listed as certified by LonMark at www.lonmark.org are acceptable.

1.8 REFERENCE STANDARDS

A. GENERAL

1. Control system components shall be new and in conformance with the following applicable standards for products specified:
2. Systems shall be made up of LonMark certified devices and LNS Based tools.
3. All controllers must be based on ANSI/CEA 709.1 LonTalk Protocol
4. All routing must be via ANSI/CEA 852 LonWorks to IP Routing

1.9 SUBMITTALS

Submit the following according to conditions of Contract and Division 23 Specification sections. In addition, provide the following:

A. Product data on all components used to meet the requirements of the specifications such as enclosures, network transceivers, Resource files, LNS Plug- ins, XIF documentation, configuration parameter options, mounting details, power supplies, etc.

B. Software documentation regarding the proposed PC operating system, third party utilities and application programs, and the proposed application program for the Control Units.

C. Logical and physical diagrams for each channel indicating each node (control devices and ID's), node address (domain, subnet and group), channel type and router specifications.

D. Submit functional temperature control diagrams for each mechanical system served by the HVAC Control System.

E. Indicate and Tag each input/output served by each Control Unit or Intelligent Device.

F. Submit 8 sets of submittals for review within 3 weeks of contract award.

1.10 SHOP DRAWINGS

A. The controls contractor shall submit AutoCAD or Visio generated schematic drawings for the entire control system for review and approval before work shall begin. Included in the submittal drawings shall be a one-page diagram depicting the complete system architecture complete with a communications riser. Drawings shall include point-to-point wiring diagrams and must show all temperature controls, start-stop arrangement for each piece of equipment, equipment interlocks, wiring terminal numbers and any special connection information required for properly controlling the mechanical equipment.

B. The submittal shall include a bill of material reference list including component manufacturer and party number as well as equipment sequences of operation.

C. The submittals shall include manufacturer's catalog data describing each item of control equipment or component provided and installed for the project.

1.11 CLOSE-OUT DOCUMENTS

A. Submit final copies of the shop drawings outlined in paragraph C above. These final submittals shall reflect all field modifications and change orders required to complete the installation. Submit the following quantities of record submittal drawings immediately following receipt of notification of substantial completion. Auto CAD drawing or VISIO files of all shop drawings on CD ROM disks or USB flash memory sticks.

B. Three (3) complete sets of documents located in a three-ring notebook and organized by subject with divider tabs. Soft copies of ALL files must also be provided with each set on CD.

1.12 OPERATION AND MAINTENANCE MANUALS

A. Submit three (3) sets of operation and maintenance manual. Include the following documentation:

B. Network Management Software User Manual specific to each tool package provided.

C. Maintenance Instructions: Document all maintenance and repair/ replacement procedures. Provide ordering number for each system component, and source of supply. Provide a list of recommended spare parts needed to minimize downtime.

D. Documentation of network variables, network node configurations, priority interrupts, node bindings, addressing structure, etc.

1.13 INSTRUCTION OF OWNER OPERATING PERSONNEL

A. All training shall be by the Controls Contractor and shall utilize specified manuals, as-built documentation, the on-line help utility and any other appropriate training materials.

B. Operator training shall include:

1. Four (4) initial eight (8)-hour sessions for a group of four (4) people

C. The initial operator-training program shall be to establish a basic understanding of basic functions, commands, routines, etc. and shall assume attendees have a sound working knowledge of the Windows operating system and PC use. The training shall encompass as a minimum:

D. Troubleshooting of input devices, i.e., bad sensors

E. Sequence of operation review

F. Sign on - sign off

G. Selection of all displays and reports

H. Commanding of points (keyboard and mouse mode)

I. Modifying label text

J. Use of all dialogue boxes and menus

K. System initialization

L. LonWorks Network Management Software (if applicable)

1.14 ACCEPTANCE PROCEDURE (COMMISSIONING)

A. The TCC shall provide to the architect 30 days prior to acceptance testing the commissioning procedures to be used for acceptance of the FAS.

B. Upon completion of the installation, the controls contractor shall start-up the system and perform all necessary calibration and testing to ensure proper operation of the project control systems.

C. Schedule a hardware demonstration and system acceptance test. The acceptance testing is defined as demonstrating the sequence of operation as indicated in the drawings. . The Controls Contractor shall perform all tests prior to scheduling the acceptance test and hardware demonstration to insure the overall system is ready prior to inspection and observations.

D. When the system performance is deemed satisfactory in whole or in part by these observers, the system parts will be accepted for beneficial use and be deemed substantially complete as defined.

E. The Controls Contractor shall prove that they controls network is functioning correction and within acceptable bandwidth criteria and shall test the system with an approved protocol analysis tool. Provide a log and statistics summary showing that each channel is within acceptable parameters. Each channel shall he shown to have at least 25% spare capacity for future expansion.

1.15 WARRANTY

A. The FAS shall be free from defects in workmanship and material under normal use and service. If within eighteen (18) months from the date of substantial completion, the installed equipment is found to be defective in operation, workmanship or materials, the building systems contractor shall replace, repair or adjust the defect at no cost. Service shall be provided within 24 hours upon notice from Owner’s designated Representative.

B. The warranty shall extend to material that is supplied and installed by the Controls Contractor. Material supplied but not installed by the Controls Contractor shall be covered per the above to the extent of the product only. Installation labor shall be the responsibility of the trade contractor performing the installation.

C. All corrective software modifications made during warranty service periods shall be updated on all user documentation and on user and manufacturer archived software disks.

1.16 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Do not install electronic hardware in the project until non-condensing environmental conditions have been established. Products installed in violation of this request maybe requested to be replaced at no additional cost to the project.

B. Coordinate storage requirements for factory mounted terminal control units on air

terminal devices, air handling units or other packaged control equipment. Do not store control units on site in non-conditioned areas for more than two weeks.

C. Factory-Mounted Components: Where control devices specified in this section are indicated to be factory mounted on equipment, arrange for shipping control devices to unit manufacturer.

PART 2 - LON PRODUCTS

2.1 REMOTE ACCESS

A. The owner shall provide an appropriate connection to the Internet to enable remote system access Owner agrees to pay monthly access charges for connection and ISP.

2.2 WEB SERVERS

A. Functionality

1. The Web Servers shall provide the interface between the LAN or WAN and the field control devices, and provide global supervisory control functions over the control devices connected to the Web Servers. It shall be capable of executing application control programs to provide:

    a. Hosting of the graphical HTML pages
    b. Calendar functions
    c. Scheduling (if no other means available)
    d. Data Logging (if no other means available)
    e. Alarm monitoring and routing (if no other means available)
    f. Time synchronization (if no other means available)
    g. Soap/XML interface
    h. Static or Dynamic IP addressing
    i. SNVT access via web pages and via XML interface
    j. SMTP Server for alarm email notification
    k. Messages and message management

B. Software licensee

1. The Software License for the Web Server(s) must be open and enable any Systems Integrator to engineer, change or modify the application once the project is complete. Restrictive engineering access to the Web server will not be acceptable.

C. Event alarm notification and actions

1. The Web Server shall provide alarm recognition, storage, routing, management, and analysis to supplement distributed capabilities of equipment or application specific

controllers.

2. The Web Server shall be able to route any alarm condition to any defined user location whether connected to a local network or remote via dial-up, telephone connection, or wide-area network.
3. Alarm generation shall be selectable for annunciation type and acknowledgement requirements.
4. Control equipment and network failures shall be treated as alarms and annunciated.
5. Alarms shall be annunciated via email notification to specific, configurable email address.
6. Alarms shall be visually identified via the HTML graphics pages. Overrides and setpoint changes shall be configured via the HTML interface.
7. Alarms shall be annunciated in any of the following manners as defined by the user:

    a. Screen message text
    b. Pagers via paging services that initiate a page on receipt of email message
    c. Graphic with flashing alarm object(s)

8. Alarms shall be logged for a period of no less than 1 week
9. Alarm logs shall be able to be transferred from the web server to a host
10. The following shall be recorded by the Web Server for each alarm (at a minimum):

    a. Time and date
    b. Location (building, floor, zone, office number, etc.)
    c. Equipment (air handler #, access way, etc.)

D. Data logging and storage

1. The web server shall have the ability to collect data for any object and store this data for future use. Data logging shall be performed either by a dedicated logger on the control network, via a combined web server/data logger, or by a central host PC attached to the network. Whichever way data logging is to be performed it must:

    a. Store data logs for at least 1 week before being overwritten
    b. Automatically update the host storage PC that the logs are approaching their full level
    c. Data logs shall be able to be transferred from the web server to a host
    d. Be easily able to append a new log to a previously saved log

E. Security and user administration

1. Communications between the Web Server and Web Browser are to adopt proven ‘Secure User Authentication’ employing 128-bit industry standard MD5 digital signatures. All transactions to/from the Web Server are to adopt the MD5 security procedures as a minimum to ensure the data on the system is protected from unauthorized access.
2. Individual web graphics pages shall have their own password protection. Groups of pages may have the same password for the same level of user. Provide at least 3 levels of user access.

F. Web browser clients

1. The system shall be capable of supporting a minimum of 20 simultaneous client connections using a standard Web browser such as Internet Explorer™, Firefox™, or Netscape Navigator™. Systems requiring additional software (to enable a standard Web browser) to be resident on the client machine, or manufacture-specific browsers shall not be acceptable.
2. The Web browser software shall run on any operating system and system configuration that is supported by the Web browser. Systems that require specific machine requirements in terms of processor speed, memory, etc., in order to allow the Web browser to function with the FMCS, shall not be acceptable.
3. The Web browser shall provide a view of the system, in terms of graphics, schedules, calendars, logs, etc. Systems that require different views or that require different means of interacting with objects such as schedules, or logs, shall not be permitted.
4. The Web browser client shall support as a minimum, the following functions:

    a. User log-on identification and password shall be required. If an unauthorized user attempts access, a blank web page shall be displayed. Security using Java authentication and encryption techniques to prevent unauthorized access shall be implemented.
    b. HTML programming shall not be required to display system graphics or data on a Web page. HTML editing of the Web page shall be allowed if the user desires a specific look or format.
    c. Storage of the graphical screens shall be in the Web Server, without requiring any graphics to be stored on the client machine. Systems that require graphics storage on each client are not acceptable.
    d. Real-time values displayed on a Web page shall update automatically without requiring a manual “refresh” of the Web page.

5. The system shall provide the capability to specify a user’s (as determined by the log-on user identification) home page. Provide the ability to limit a specific user to just their defined home page. From the home page, links to other views, or pages in the system shall be possible, if allowed by the system administrator.
6. Graphic screens on the Web Browser client shall support hypertext links to other locations on the Internet or on Intranet sites, by specifying the Uniform Resource Locator (URL) for the desired link.

2.3 PROGRAMMABLE CONTROL UNIT (PCU)

A. General requirements

1. System controllers shall share network variable data with other LON-based devices that utilize the same transceivers as referenced previously.
2. Operating system software, custom operating sequence software and application programs shall be stored in programmable, non-volatile memory.
3. The complete programmable controller including accessory devices such as relay, transducers, power supplies, etc., shall be wired and housed in an enclosure or as required by the location and local code requirements.
4. Provide programmable controller boards with external interface jacks to provide an optional communication link.

5. Equip programmable controller with diagnostic indicators for the following:

    a. Transmit.
    b. Receive.

B. Service (health) indication lamp(s) Input/Output requirements

1. The programmable controller shall accommodate digital and analog input and output points as appropriate for the task it was intended to perform. For troubleshooting and load analysis, the value of each analog output shall be available in the database for trending and display.
2. Each controller shall have 10% spare point capacity when installed.

C. Accessories

1. Provide the following with each PCU:

    a. Over current and transient power protection

D. Programmable controller software

1. A programmable controller shall operate totally standalone and independent of a central computer or master controller for all specified control applications.
2. Operating System software shall:

    a. Reside in programmable power failure backed RAM,
    b. Operate in real-time, provide prioritized task scheduling,
    c. Control time programs,
    d. Scan inputs and outputs.
    e. Contain built in diagnostics.

3. Input/Output Point Processing Software shall include:

    a. Continuous update of input and output values and conditions
    b. All connected points are to be updated at a minimum of one-second intervals.
    c. Assignment of proper engineering units and status condition
    d. identifiers to all analog and digital input and outputs

4. A "fixed mode" option shall be supported to allow inputs and outputs from DDC control programs to set to a fixed state or value. When in the "fixed mode" inputs and output shall be assigned a high residual command priority to prevent override by application programs.
5. Run time shall be accumulated based on the status of a digital output point. It shall be possible to totalize either on time or off time up to 60,000 hours with one-minute resolution. Run time counts shall be resident in non-volatile memory and have PCU resident run time limits assignable through the operator's terminal.
6. A transition counter shall be provided to accumulate the number of times a device has been cycled on or off. Counter is to be non-volatile and be capable of accumulating 60,000 switching cycles. Limits shall be assignable to counts to provide maintenance alarm

printouts.

7. Custom DDC programs are to be provided to meet the control strategies as called for in the sequence of operation sections of these specifications.
8. Each PCU shall have resident in its memory and available to the programs a full library of DDC algorithms, intrinsic control operators, arithmetic, logic and relational operators for implementation of control sequences.
9. The PCU shall include Proportional plus Integral (PI), and Proportional plus Integral plus Derivative (PID) control loops.
10. DDC control programs shall include an assignment of initialization values to all outputs to assure that controlled devices assume a fail-safe position on initial system start-up.

2.4 TERMINAL DEVICE CONTROL UNIT (TDCU)

A. General Requirements

1. Control Units shall be equipped with an appropriate Neuron microprocessor controller, programmable non-volatile memory for general data processing, power supply, input/output modules, termination blocks and network transceivers of adequate size and quantity to perform the function they were intended to.
2. System controllers shall be capable of sharing network variable data with other LON-based devices.
3. Operating system software, custom operating sequence software and application programs shall be stored in programmable, non-volatile memory.
4. It shall be possible to make changes to the application program and/or configuration of any controller in real-time with no interruption of the operation of the controlled equipment. Systems that require that the controller be taken offline and/or require the shutdown of the controlled equipment are not acceptable.
5. The TDCU shall synchronize time with a PCU on the network upon power up of the network.

B. TDCU Software

1. General: A TDCU shall operate totally standalone and independent of a central computer for all specified control applications. Software shall include a complete Operating System (O.S.), communications handler, point processing, standard control algorithms, and specific control sequences.
2. O.S. software shall reside in programmable flash memory, operate in real- time, provide prioritized task scheduling, control time programs, and scan inputs and outputs. O.S. shall also contain built in diagnostics.
3. TDCU's shall have application specific programs to minimize configuration and installation time. Application specific programs shall be able to be changed so the same hardware component can be utilized in the event the mechanical equipment is removed, and new mechanical equipment has been added.
4. Input/Output Point Processing Software shall include:

    a. Continuous update of input and output values and conditions
    b. All connected points are to be updated at a minimum of one-second intervals

c. Assignment of proper engineering units and status condition identifiers to all analog and digital input and outputs

5. A "fixed mode" option shall be supported to allow inputs to, and outputs from DDC control programs to set to a fixed state or value. When in the "fixed mode" inputs and output shall be assigned a high residual command priority to prevent override by application programs.

2.5 NETWORK INTERFACES, LON ROUTERS, BRIDGES REPEATERS AND TRANSCEIVERS

A. Internet servers, Routers, Bridges and Repeaters

1. Equip each Internet server, router and bridge with a network transceiver on each network port (inbound and outbound) as dictated by the network type (Type 1 - FTT, Type 2 - TP, Type 3 - PL, Type 4 - LP, Type 5 - RF).
2. The network router shall be designed to route messages from a segment, sub-net, or domain in full duplex communication mode.
3. Routers and bridges shall utilize LonTalk protocol transport, network, and session layers to transparently route messages bound for a node address in another sub-net or domain exclusively.
4. Routers, bridges and repeaters shall be fully configurable and permit a systems integrator to define message traffic, destination, and other network management functions utilize LonWorks Devices used for routing, bridging, or repeaters
5. The routers, bridges, and repeaters shall be capable of DIN rail or panel mounting and be equipped with status LED lights for Network traffic and power.

2.6 TEMPERATURE SENSORS AND TRANSMITTERS

A. General Sensor & Transmitter Requirements

1. Provide sensors and transmitters required as outlined in the input/output summary and sequence of operation, and as required to achieve the accuracy as specified.
2. Sensors can be of type RTD, Thermistor, and transmitter.
3. The following accuracy’s are required and include errors associated with the sensor, lead wire and A to D conversion.

	Point Type	Accuracy
(1)	Outside Air	0.5°F
(2)	Chilled Water	0.5°F.
(3)	Room Temperature	1.00°F.
(4)	Hot Water/Steam	0.75°F.
(5)	Duct Temperature	0.5°F.
(6)	Sensors used in energy, water (BTU) or process calculations	0.1°F.

Note: Sensors used in BTU or process calculations shall be accurate to ±0.10°. over the process temperature range. Submit a manufacturer's calibration report.

B. Thermowells

1. When thermowells are required, the sensor and well shall be supplied as a complete assembly including wellhead and Greenfield fitting.
2. Thermowells shall be pressure rated and constructed in accordance with the system working pressure
3. Thermowells and sensors shall be mounted in a threadolet or 1/2" NPT saddle and allow easy access to the sensor for repair or replacement.
4. Thermowells shall be constructed of the following materials:

	Coolant	Material
2.	Chilled and Hot Water	Brass
3.	Steam	304/316 stainless steel
4.	Brine (salt solutions)	marine grade stainless steel

C. Outside air sensors

1. Outside air sensors shall be designed to withstand the environmental conditions to which they will be exposed. They shall also be provided with a solar shield.
2. Sensors exposed to wind velocity pressures shall be shielded by a perforated plate surrounding the sensor element.
3. Temperature transmitters shall be of NEMA 3R construction and rated for ambient temperatures.

D. Duct Type Sensors

1. Duct mount sensors shall mount in a electrical box through a hole in the duct and be positioned so as to be easily accessible for repair or replacement. A neoprene grommet (Seal-tite fitting and mounting plate) shall be used on the sensor assembly to prevent air leaks.
2. Duct sensors shall be insertion type and constructed as a complete assembly including lock nut and mounting plate. Duct sensors probe shall be constructed of 304/316 stainless steel.
3. For outdoor air duct applications, use a weatherproof mounting box with weatherproof cover and gasket.

E. Averaging Duct Type Sensors

1. For ductwork greater any dimension than 48 inches and/or where air temperature stratification exists, utilize an averaging sensor with multiple sensing points. The averaging sensor shall be installed complete with end cap, compression fittings, gaskets, mounting flange and required accessories.
2. Provide capillary supports at the sides of the duct to support the sensing string.

a. Intelligent LonWorks Room Sensors

1) Room temperature sensors are to be provided with a cover to prevent accidental damage.
2) Provide LonMark certified device for communication with the communication network.

2.7 RELATIVE HUMIDITY SENSORS/TRANSMITTER

A. The humidity transmitter shall meet the following overall accuracy including lead loss.

B. Room Type Sensor ±3% RH

C. Transmitters shall be shipped factory pre-calibrated.

D. Differential Pressure Transmitters and Accessories

2.8 GENERAL AIR AND WATER PRESSURE TRANSMITTER REQUIREMENTS:

A. Pressure transmitters shall be constructed to withstand 100% pressure over-range without damage and to hold calibrated accuracy when subject to a momentary 40% over-range input.

B. Differential pressure transmitters used for flow measurement shall be sized to the flow-sensing device and shall be supplied with shutoff and bleed valves in the high and low sensing pick-up lines (3 valve manifolds).

C. Provide a minimum of a NEMA 1 housing for the transmitter. Locate transmitters in accessible local control panels wherever possible.

1. Low Air Pressure Applications (0 to 0.5" WC)

a. The pressure transmitter shall be capable of transmitting a linear electronic signal proportional to the differential of the room and reference static pressure input signals with the following minimum performance specifications.

1) Span: Not greater than two times the design space DP.
2) Accuracy: Plus or minus 0.5% of full scale
3) Dead Band: Less than 0.3% of output.
4) Repeatability: Within 0.2% of output.
5) Linearity: Plus or minus 0.2% of span.
6) Response: Less than one second for full span input.
7) Temperature Stability: Less than 0.01% output shift per degree F. change.

2. Flow, Pressure, and Electrical Measuring Apparatus

a. Traverse Probe Air Flow Measuring Stations

1) Traverse probes shall be of a dual manifolded, cylindrical, type constructed of 3003 extruded aluminum with an anodized finish to eliminate surface pitting and unnecessary air friction. The multiple total pressure manifold shall have sensors located along the stagnation plane of the approaching air flow and without the physical presence of forward projecting sensors into the air stream.
2) The static pressure manifold shall incorporate dual offset static tips on opposing sides

of the averaging manifold so as to be insensitive to flow-angle variations of as much as ±20o in the approaching air stream.

3) The airflow traverse probe shall not induce a measurable pressure drop, nor shall the sound level within the duct be amplified by its singular or multiple presence in the air stream. Each airflow- measuring probe shall contain multiple total and static pressure sensors placed at equal distances along the probe length. The number of sensors on each probe and the quantity of probes utilized at each installation shall comply with the ASHRAE Standards for duct traversing.
4) Traverse probes shall be accurate to ±25% of the measured airflow range down to 0.25" WC static pressure.
5) Each flow measuring station shall be complete with its own dedicated microprocessor with a 4-line, 80 character, Alpha Numeric display and full function keypad. The panel shall be fully programmable and display calculated CFM directly on a LED monitor on the panel face.
6) Each station shall log airflow rates in real time and download data to its control unit (CU) via a RS-232 interface.

b. Shielded Static Pressure Sensor

1) Provide for each zone where required a shielded static pressure sensor suitable for ceiling or wall (See drawings) surface mounting, complete with multiple sensing ports, pressure impulse suppression chamber with minimum volume of 50 cubic inches, airflow shielding, and 3/8" compression takeoff fittings, all contained in a welded stainless steel casing, with polish finish on the exposed surfaces.
2) These probes shall be capable of sensing the static pressure in the proximity of the sensor to within 1% of the actual pressure value while being subjected to a maximum airflow of 1000 FPM from a radial source.
3) The shielded static sensing devices shall be used for both reference and space pressure sensing.
4) Pressure sensors used for outside air pressure reference purposes shall be equipped with a conduit seal for pneumatic tubing and bushings for a weather tight installation.

c. Static Pressure Traverse Probe

1) Provide multipoint traverse probes in the duct at each point where static pressure sensing is required.
2) Each duct static traverse probe shall contain multiple static pressure sensors located along the exterior surface of the cylindrical probe. Pressure sensing points shall not protrude beyond the surface of the probe.
3) The duct static traverse probe shall be of 304 stainless steel construction and (except for 3/4" dia. probes with lengths of 24" or less) be complete with threaded end support rod, sealing washer and nut, and mounting plate with gasket and static pressure signal fitting. The static traverse probe shall be capable of producing a steady, non-pulsating signal of standard static pressure without need for correction factors, with an instrument accuracy of 21.

d. Venturi Flow meter

1) Pressure drop on venturi type flow meters shall not exceed 0.25" WC. Each venturi low and high-pressure taps shall be equipped with nipples, valves and quick disconnects.
2) Equip each venturi with a metal identification tag indicating the size, location, GPM and meter reading for the GPM specified.
3) Provide (1) 6" dial differential pressure meter of the proper range to determine piping system flow rate. The meter shall be the property of the Owner.
4) Venturi meters shall utilize flanged or screwed connections for removal purposes and shall be rated for the system operating pressures.
5) The venturi flow meter shall be factory calibrated to provide a minimum of flow accuracy between actual and factory flow calibration data.

2.9 CURRENT TRANSFORMERS

A. The current transformers shall be designed to be installed or removed without dismantling the primary bus or cables. The transformer shall be of a split core design.

B. The core and windings shall be completely encased in a UL approved thermoplastic rated 94VA. No metal parts shall be exposed other than the terminals.

C. The current transformers shall meet the following specifications:

1. Frequency Limits: 50 to 400 Hz.

2. Insulation: 0.6 KV Class, 10 KV BIL.

3. Accuracy: ± 1% at 5.0 to 25.0 VA accuracy class with U.P.F. burden.

D. Provide a disconnect switch for each current transformer.

2.10 CURRENT SENSING SWITCHES

A. Current sensing switch shall be self-powered with solid-state circuitry and a dry contact output. Current sensing switches shall consist of a solid state current sensing circuit, adjustable trip point, solid state switch, SPDT relay and an LED indicating the on or off status. A conductor of the load shall be passed through the window of the device. It shall accept over current up to twice its trip into range.

2.11 ELECTRONIC VALVE & DAMPER ACTUATORS

A. General Requirements

1. Electronic actuators shall be electric, direct-coupled type capable of being mounted over

the shaft of the damper. They shall be UL listed and the manufacturer shall provide a 2-year unconditional warranty from the date of commissioning. Power consumption shall not exceed 8 watts or 15 VA of transformer sizing capacity per high torque actuator nor 2 watts or 4 VA for VAV actuators.

2. Electronic overload protection shall protect actuator motor from damage. If damper jams actuator shall not burnout. Internal end switch type actuators are not acceptable. Actuators may be mechanically and electrically paralleled on the same shaft to multiply the available torque. A reversing switch shall be provided to change action from direct to reverse in relation to control signal as operation requires.

B. Combination Smoke and Fire Damper Actuators

1. Actuators shall be factory mounted and connected to the damper section and shall conform to UL 555S specifications.
2. Actuators shall be rated for 350°F.

C. Control Valve Actuators (3 inch and smaller)

1. Actuators shall have a gear release button on all non-spring return models to allow manual setting. The actuator shall have either an insulating air gap between it and the linkage or a non-conducting thermoplastic linkage. Care shall be taken to maintain the actuator's operating temperatures and humidity within its specifications. Pipes shall be fully insulated and heat shields shall be installed if necessary. Condensation may not form on actuators and shall be prevented by a combination of insulation, air gap, or other thermal break.
2. The control circuit shall be fully modulating using 2 - 10 volt or 4 - 20 mA signals. Accuracy and repeatability shall be within 1/21 of control signal. A 2 - 10 v or 4 - 20 mA signal shall be produced by the actuator which is directly proportional to the shaft clamp position which can be used to control actuators which are paralleled off a master motor or to provide a feedback signal to the automation system indicating valve position.
3. Valve body and actuators shall be shipped fully assembled and tested at the valve factory prior to shipment.

D. Control Valve Actuators (4 inch and larger).

1. The valve actuator shall consist of a permanent split capacitor, reversible type electric motor that drives a compound epicycle gear. The electric actuator shall have visual mechanical position indication, readable from a distance of 25 feet, showing output shaft and valve position. Unit shall be mounting directly to the valves without brackets and adapters, or readily adapted to suit all other type quarter-turn valves.
2. The actuator shall have an integral terminal strip, which, through conduit entries, will ensure simple wiring to power supplies. Cable entries shall have UL recommended gland stops within the NPT hole to prevent glands from being screwed in too far and damaging cable.
3. The actuator shall be constructed to withstand high shock and vibrations without operations failure. The actuator cover shall have captive bolts to eliminate loss of bolts when removing the cover from the base. One copy of the wiring diagram shall be provided with the actuator.
4. The actuator shall have a self-locking gear train, which is permanently lubricated, at the

factory. The gearing shall be run on ball and needle bearings. Actuators with 600 in/lbs. or more output torque shall have two adjustable factory calibrated mechanical torque limit switches of the single- pole, double-throw type.

5. The motor shall be fitted with thermal overload protection.
6. The motor rotor shaft shall run in ball bearings at each end of motor.
7. The actuator housing shall be hard anodized aluminum for full environmental protection.
8. The environmental temperature range of the actuator shall be -30°C to +60°C (-20°F to +140°F).
9. For intermittent on/off service, the actuator shall be rated at a 20% duty cycle (i.e., 12 minutes extended duty in every hour, or alternatively; one complete cycle every 2 minutes). For more frequent cycling and modulating service, an actuator shall be rated for continuous duty. The actuator rated for continuous duty shall be capable of operating 100% of the time at an ambient temperature of 40°C.
10. The actuator shall have an integral self-locking gear train. Motor brakes shall not be required to maintain desired valve position. Levers or latches shall not be required to engage or disengage the manual override. Mechanical travel stops, adjustable to 15° in each direction of 90° rotation shall be standard, as well as two adjustable travel limit switches with electrically isolated contacts. Additional adjustable switches shall be available as option.
11. Single Phase Motor: The motor shall have Class B insulation capable of withstanding locked-rotor for 25 seconds without overheating. Wiring shall also be Class B insulation. An auto-reset thermal cutout protector shall be embedded in the motor windings to limit heat rise to 80°C in a 40°C ambient. All motors shall be capable of being replaced by simply disconnecting the wires and then removing mounting bolts. Disassembly of gears shall not be required to remove the motor.
12. Materials of Construction: The electric actuator shall have a pressure die- cast, hard-anodized aluminum base and cover. The compound gear shall be made of die-cast, hard-anodized aluminum or steel. An alloy steel worm gear shall be provided for manual override and torque limiting. Bearings for gears shall be of the ball and needle type; bronze bearings shall be used on the shafting parts.

2.12 CONTROL VALVES

A. General Control Valve Requirements

1. All automatic control valves shall be linear, fully proportioning, with modulating ball, plug or V-port inner guides unless otherwise specified. The valves shall be quiet in operation and fail safe in either normally open or normally closed position in the event of control air failure or loss of electronic output signal.
2. All valves shall be capable of operating in sequence when required by the sequence of operation. All control valves shall be sized by the control manufacturer, and shall be guaranteed to meet the heating and cooling loads as specified. All control valves shall be suitable for the pressure conditions, and shall close against the differential pressures involved. Valve body pressure rating and connection type (screwed or flanged) shall conform to ANSI pressure classifications appropriate for the system working pressures.

    a. Hot and Cold Water Control Valves

1) Hot and cold water globe type control valves shall be single-seated type, with equal percentage flow characteristics. The valve discs shall be composition type and shall be sized using ISA methods.
2) Pressure drop through the valves shall not exceed 5 psi unless otherwise indicated.
3) Ball valves shall be equipped with 316 stainless steel trim, Teflon seals and adjustable packing gland nuts. Provide a handle for manual operation during start-up and maintenance.

2.13 SWITCHES

A. Current Sensing Switches

1. Current sensing switch shall be self-powered with solid-state circuitry and a dry contact output. Current sensing switches shall consist of a solid state current sensing circuit, adjustable trip point, solid state switch, SPDT relay and an LED indicating the on or off status. A conductor of the load shall be passed through the window of the device. It shall accept over current up to twice its trip into range.

2.14 ELECTRICAL CONTROL POWER AND LOW VOLTAGE WIRING

A. Provide interlock wiring between supply and exhaust fans, electrical wiring for relays (including power feed) for temperature and pressure indication.

B. Provide power wiring, conduit and connections for low temperature thermostats, high temperature thermostats, alarms, flow switches, actuating devices for temperature, humidity, pressure and flow indication, point resets and user disconnect switches for electric heating, appliances controlled by this Section.

C. Provide all other wiring required for the complete operation of the specified systems.

D. Install all wiring raceway systems complying with the requirements of the National Electrical Code.

2.15 NETWORK COMMUNICATION REQUIREMENTS

A. Wired network communication shall follow the published guidelines for twisted pair LonWorks network.

B. In all communication conduits, provide one spare twisted pair to be installed, tagged and labeled at each end.

C. Communication conduits shall not be installed closer than six feet from high power transformers or run parallel within six feet of electrical high power cables. Care shall be taken to route the cable as far from interference generating devices as possible. Where communication wire must cross high power wire (deemed as 110VAC or greater) it must do so at right angles.

D. All shields shall be grounded (earth ground) at one point only to eliminate ground loops. All shield grounding shall be done at the controller location with the shield at the sensor/device end of the applicable wire being left long and "safed" off in an appropriate manner.

E. There shall be no power wiring, in excess of 30 VAC rms, run in conduit with communications wiring. In cases where signal wiring is run in conduit with communication wiring, all communication wiring and signal wiring shall be run using separate twisted pairs (24awg) in accordance with the manufacturer's wiring practices.

2.16 INPUT/OUTPUT CONTROL WIRING

A. RTD wiring shall be two-wire or four-wire twisted, shielded, minimum number 18 gauge.

B. Other analog inputs shall be a minimum of number 18 gauge, twisted, (shielding optional).

C. Binary control function wiring shall be a minimum of number 18 gauge.

D. Analog output control functions shall be a minimum of number 18 gauge, twisted, shielded.

E. Binary input wiring shall be a minimum of number 18 gauge.

1. SPLICES

a. Splices in shielded cables shall consist of terminations and the use of shielded cable couplers, which maintain the integrity of the shielding. Terminations shall be in accessible locations. Cables shall be harnessed with cable ties as specified herein.

2.17 CONDUIT AND FITTINGS

A. Conduit for Control Wiring, Control Cable and Transmission Cable: Electrical metallic tubing (EMT) with compression fittings, cold rolled steel, zinc coated or zinc-coated rigid steel with threaded connections.

B. Outlet Boxes (Dry Location): Sheradized or galvanized drawn steel suited to each application, in general, four inches square or octagon with suitable raised cover.

C. Outlet Boxes (Exposed to Weather): Threaded hub cast aluminum or iron boxes with gasket device plate.

D. Pull and Junction Boxes: Size according to number, size, and position of entering raceway as required by National Electrical Codes. Enclosure type shall be suited to location.

2.18 RELAYS

A. Relays other than those associated with digital output cards shall be general purpose, enclosed plug-in type with 8-pin octal plug and protected by a heat and shock resistant duct cover. Number

of contacts and operational function shall be as required.

1. Solid State Relays (SSR)

B. Input/output isolation shall be greater than lOE9 ohms with a breakdown voltage of 1500V root mean square or greater at 60 Hz. The contact life shall be 10 x 10 E6 operations or greater. The ambient temperature range of SSRs shall be -20 to +140F. Input impedance shall not be less than 500 ohms. Relays shall be rated for the application. Operating and release time shall be for 100 milliseconds or less. Transient suppression shall be provided as an integral part of the relay.

1. Contactors

C. Contactors shall be of the single coil, electrically operated, and mechanically held type. Positive locking shall be obtained without the use of hooks, latches, or semi permanent magnets. Contractor shall be double-break-silver-to-silver type protected by arcing contacts. The number of contacts and rating shall be selected for the application. Operating and release times shall be 100 milliseconds or less. Contactors shall be equipped with coil transient suppression devices.

2.19 AUTOMATIC CONTROL VALVE TAGS

A. For valves, etc., use metal tags with a 2-inch minimum diameter, fabricated of brass, stainless steel or aluminum. Attach tags with chain of same materials. For lubrication instructions, use linen or heavy duty shipping tag.

B. Tag valves with identifying number and system. Number valves by floor level, column location and system served.

C. Prepare lists of all tagged valves showing location, floor level, and tag number, use. Prepare separate lists for each system. Include copies in each maintenance manual.

2.20 WIRE TAGS

A. All multi-conductor cables in all pull boxes and terminal strip cabinets shall be tagged.

B. Provide wire Tags as per Division 26.

2.21 CONDUIT TAGS

A. Provide tagging or labeling of conduit so that it is always readily observable which conduit was installed or used in implementation of this Work.

2.22 MISCELLANEOUS EQUIPMENT IDENTIFICATION

A. Screwed-on, engraved black lamicoid sheet with white lettering on all control panels and remote processing panels. Lettering sizes subject to approval.

B. Inscription, subject to review and acceptance, indicating equipment, system numbers, functions and switches. For panel interior wiring, input/output modules, local control panel device identification.

2.23 USER INTERFACE SOFTWARE

2.24 BASIC CONVENTIONAL OPERATORS WORKSTATION SOFTWARE

A. The Operators Workstation and laptop computer shall be equipped with Microsoft ® Windows most current, compatible, operating system as the user terminal operating software.

B. The Operators Workstation software is installed to provide basic operator interface (i.e., non-facility management/color graphics) shall use pull down menu navigation as the basis of program execution, operating feature penetration, and local or remote site access.

C. Manual Database Save and Restore. A system operator with the proper password clearance shall be able to archive the database and store on electronic, magnetic, or optical media.

D. Security. Each operator shall be required to log on to the system with a user name and password in order to view, edit, add, or delete data. System security shall be selectable for each operator. The system supervisor shall have the ability to set passwords and security levels for all other operators.

2.25 CUSTOM APPLICATION PROGRAMMING FEATURES

A. The language shall be English language oriented and be based on the syntax of programming languages such as BASIC. It shall allow for free form or fill-in-the- blank programming. Alternatively, the programming language can be graphically-based using function blocks as long as blocks are available that directly provide the functions listed below, and that custom or compound function blocks can be created.

B. A full screen character editor/programming environment shall be provided. The editor shall be cursor/mouse-driven and allow the user to insert, add, modify, and delete code from the custom programming. It shall also incorporate word processing features such as cut-paste and find/replace.

C. The programming language shall allow independently executing program tasks to be developed.

D. The editor/programming environment shall have a debugging/simulation capability that allows the user to step through the program and to observe any intermediate values and/or results. The debugger shall also provide error messages for syntax and execution errors.

E. The programming language shall support conditional statements (IF/THEN/ELSE/ELSE-IF) using compound Boolean (AND, OR and NOT) and/or relations (EQUAL, LESS THAN, GREATER THAN, NOT EQUAL) comparisons.

F. The programming language shall support floating-point arithmetic using the following operators: +, -, /, x, square root, and xy. The following mathematical functions shall also be provided: absolute value and minimum/maximum value from a list of values.

G. The programming language shall have pre-defined variables that represent clock time, day of the week, and date. Variables that provide interval timing shall also be available. The language shall allow for computations using these values.

H. The programming language shall have the ability to pre-define variables representing the status and results of the System Software, and shall be able to enable, disable, and change the values of objects in the system.

I. On-Line Help. Provide a context sensitive, on-line help system to assist the operator in operation and editing of the system. On-line help shall be available for all applications and shall provide the relevant data for that particular screen.

J. A program shall automatically send notifications to a programmable, editable, list of email addresses.

2.26 OPTIONAL TELEPHONE INTERFACE SOFTWARE

A. The system user shall have the option to incorporate telephone access to the system. The telephone interface system shall override system schedules for devices from any LON manufacturer.

B. If required a standard analog telephone line will be provided. The telephony interface shall use a standard modem interface and not require any custom phone switch equipment.

2.27 USER INTERFACE/OPERATOR WORK STATION (OWS) HARDWARE

A. The operator workstation shall be an enterprise class, vertical, PC running a currently supported version of the Windows operating system, currently Windows 7 Pro 64-bit.

B. The PC shall be of a current, fully configured model with the following minimum hardware requirements
1. 1 - 500GB– SATA 6 Gb/s – 7200 RPM – Enterprise class hard disk drive for 24/7 operation for programs only.
2. 1 – 1TB– SATA 6 Gb/s – 7200 RPM – Enterprise class hard disk drive for 24/7 operation for data only.
3. 16 GB DDR3 Ram memory – PC3-12800 1600MHz – Maximum memory supported 32GB
4. 4 memory slots total – 2 memory slots free
5. Video memory2GB GDDR5 SDRAM
6. GPU/VPU – Nvidia Quadro K2000
7. 3.4 GHz processor – Xeon class
8. Ethernet interface – 100BaseT
9. V.96 internal modem
10. CD Rom/DVD Rom burner – DVD+-RW DL
11. 17” flat screen color monitor – 1600X900 minimum resolution – Contrast ratio 1000:1- Anti-glare screen.
12. Monitor stand height-adjustable stand, tilt, pivot, swivel and built in cable-management
13. USB optical mouse/pointing device and USB keyboard
14. Speakers
15. 3 – 5.25 external bays free

16. 3 – 3.5 internal bays free
17. 2 – PCI express X16 slots free
18. 2 – PCI express X1 slots free
19. 2 – PCI slots free
20. 1 – PCI express X8 slot free
21. 2 – audio out jack
22. 1- line-in jack
23. 2 – Microphone jacks
24. 2 - DVI Video
25. 3- Display ports
26. 5 – USB 2.0 ports
27. 4 – USB 3.0 ports
28. 1 – LAN Interface – RJ-45 – Intel 82579LM-10/100/1000Mbps
29. 1- LAN Chipset – Intel 82579LM – Provide fiber optic isolation.
30. 1- Power supply 400Warr-AC 120/230V 50/60 Hz.

C. Standard software included shall be:

1. Anti-virus software
2. Microsoft Office
3. Internet browser
4. Backup to CD/DVD software
5. LNS Based Network Management Tool

2.28 USER INTERFACE/REMOTE ACCESS HARDWARE

A. Laptop computer system, currently Windows 7 Pro 64-bit.

B. The laptop computer shall be of a current, fully configured model with the following minimum hardware requirements

1. 1 – 1TB– SATA 6 Gb/s – 5400 RPM – hard disk drive
2. 16 GB DDR3L memory –1600MHz SDRAM– 8GB+8gb
3. 4 memory slots total – 2 memory slots free
4. Video memory2GB GDDR5 SDRAM
5. GPU/VPU – Nvidia Quadro K2000
6. 3.4 GHz processor –4700MQ
7. Ethernet interface – 100BaseT
8. Premium US keyboard with 10-key pad (Black), Touch pad pointing device with multi touch control
9. DVD SuperMulti (+/-R double layer) drive
10. 15.6” flat screen color led back-lit anti-glare display – 1366x768 resolution
11. Wi-Fi® Wireless networking (802.11a/g/n)+ Bluetooth 4.0 (300 Mbps
12. Speakers – standard stereo
13. 1 – audio out jack
14. 1- line-in jack
15. 2 – Microphone jacks

16. 2 - DVI Video
17. 1- Display ports
18. 1 – USB 2.0 ports
19. 2 – USB 3.0 ports
20. 2 – HDMI ports
21. 1-RGB port
22. 1 – LAN Controller Intel 1Gbps. Provide fiber optic isolation.
23. AC Adapter 45W (19V 2.37A) Auto-sensing, 100-240V / 50-60Hz input, 90W (15V 6A) Auto-sensing, 100-240V / 50-60Hz input Lithium-Ion Battery (43Wh, 4-Cell)

C. Standard software included shall be:

1. Security and Anti-virus software
2. Microsoft Office – Home and business 20013
3. Internet browser
4. Backup to CD/DVD software
5. LNS Based Network Management Tool

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that systems are ready to receive work.

B. Beginning of installation means installer accepts existing conditions.

C. The project plans shall be thoroughly examined for control device and equipment locations, and any discrepancies, conflicts, or omissions shall be reported to the Architect/Engineer for resolution before rough-in work is started.

D. The contractor shall inspect the site to verify that equipment is installable as show, and any discrepancies, conflicts, or omissions shall be reported to the Architect/Engineer for resolution before rough-in work is started.

E. The Controls Contractor shall examine the drawings and specifications for other parts of the work, and if head room or space conditions appear inadequate or if any discrepancies occur between the plans and his work and the plans for the work of others, he shall report such discrepancies to the Architect/Engineer and shall obtain written instructions for any changes necessary to accommodate his work with the work of others.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Install all control components in accordance with manufacturer's instructions and recommendations.

B. If the controls contractor is responsible for providing the damper then provide mixing dampers of parallel blade construction arranged to mix streams. Provide separate minimum outside air damper section adjacent to variable outside air damper.

C. Mount control panels adjacent to associated equipment on vibration-free walls or freestanding angle iron supports. One cabinet may accommodate more than one system in same equipment room. Provide nameplates for instruments and controls inside cabinet and nameplates on cabinet face.

D. After completion of installation, test and adjust control equipment. Submit data showing setpoints and final adjustments of controls.

E. Install equipment, piping, wiring/conduit parallel to building lines (i.e., horizontal, vertical, and parallel to walls) wherever possible.

F. Provide sufficient slack and flexible connections to allow for vibration of piping and equipment.

G. Verify integrity of all wiring to ensure continuity and freedom from shorts and grounds.

H. All equipment, installation, and wiring shall comply with acceptable industry specifications and standards for performance, reliability, and compatibility and be executed in strict adherence to local codes and standard practices.

3.3 ELECTRICAL SYSTEM INSTALLATION

A. Comply with all Division 26 Installation Requirements.

B. Install low voltage power and LON and LAN communication trunks in conduit in the following locations regardless of local building code allowances otherwise.

1. Mechanical rooms
2. Electrical rooms
3. Vertical risers (exception: fire rated continuous closet like a telephone closet)
4. Open Areas where the wiring will be exposed to view or tampering

C. Conceal conduit within finished shafts, ceilings and wall as required. Install exposed conduit parallel with or at right angles to the building walls and ceilings.

D. Where Class 2 wires are in concealed and accessible locations including ceiling return air plenums, approved cables not in raceway may be used provided that:

1. Circuits meet NEC Class 2 (current-limited) requirements. (Low-voltage power circuits shall be sub-fused when required to meet Class 2 current- limit.)
2. All cables shall be UL listed for application, i.e., cables used in ceiling plenums shall be UL listed specifically for that purpose.

E. Do not install Class 2 wiring in conduit containing Class 1 wiring. Boxes and panels containing high voltage may not be used for low voltage wiring except for the purpose of interfacing the two (e.g., relays and transformers).

F. Where Class 2 wiring is run exposed, wiring to be run parallel along a surface or perpendicular to it, and NEATLY tied at 3m (10 ft.) intervals minimum.

G. All wire-to-device connections shall be made at a terminal blocks or terminal strip. All wire-to-wire connections shall be at a terminal block, or with a crimped connector. All wiring within enclosures shall be neatly bundled and anchored to permit access and prevent restriction to devices and terminals.

H. Plug or cap all unused conduit openings and stub-ups. Do not use caulking compound.

I. Route all conduit to clear beams, plates, footings and structure members. Do not route conduit through column footings or grade beams.

J. Set conduits as follows:

1. Expanding silicone fire stop material sealed watertight where conduit is run between floors and through walls of fireproof shaft
2. Oakum and lead, sealed watertight penetration through outside foundation walls

K. Cap open ends of conduits until conductors are installed.

L. Where conduit is attached to vibrating or rotating equipment, flexible metal conduit with a minimum length of 18 inches and maximum length of 36 inches shall be installed and anchored in such a manner that vibration and equipment noise will not be transmitted to the rigid conduit.

M. Where exposed to the elements or in damp or wet locations, waterproof flexible conduit shall be installed. Installation shall be as specified for flexible metal conduit.

N. Provide floor, wall, and ceiling plates for all conduits passing through walls, floors or ceilings. Use prime coated cast iron, split-ring type plates, except with polished chrome-plated finish in exposed finished spaces.

3.4 SEQUENCE OF OPERATIONS

Refer to section 230993SEQUENCE OF OPERATION FOR HVAC CONTROLS.

3.5 GENERAL

A. Provide automatic control for system operation as described herein, although word “automatic” or “automatically”, is not used.

B. Provide control devices, control software and control wiring as required for automatic operation of each sequence specified.

C. Manual operation is limited only where specifically described; however, provide manual override for each automatic operation.

D. Where manual start-up is called for, also provide scheduled automatic start-stop capabilities.

E. Functions called for in sequence of operations are minimum requirements and not to limit additional capabilities the DDC system can be provided with.

F. Provide the following functions which are not specifically mentioned in each sequence of operation for each item of equipment:

1. Start-Stop, manual, and scheduled
2. On-Off status of each piece of equipment
3. Run-time
4. All setpoints shall be adjustable
5. Sequenced starting of all motors

3.6 TEMPERATURE SENSORS

A. Temperature sensor assemblies shall be readily accessible and adaptable to each type of application in such manner as to allow for quick, easy replacement and servicing without special tools or skills.

B. Strap-on mountings shall not be permitted.

C. Outdoor installations shall be; of weatherproof construction or in appropriate NEMA enclosures. These installations shall be protected from solar radiation and wind effects. Protective shield shall be stainless steel.

D. Sensors shall be with enclosure where located in finished space.

E. Sensors in ducts shall be mounted in locations to sense the correct temperature of the air only and shall not be located in dead air spaces or positions obstructed by ducts, equipment, and so forth. Locations where installed shall be within the vibration and velocity limit of the sensing element. Ducts shall be securely sealed where elements or connections penetrate ducts to avoid measuring false conditions.

F. All sensors measuring temperatures in pipes larger than 2 inches in diameter or in pressure vessels shall be supplied with wells properly fabricated for the service. Wells shall be non-corrosive to the medium being measured and shall have sufficient physical strength to withstand pressures and velocities to which they are subjected. Wells shall be installed in the piping at elbows where piping is smaller than the length of the well to affect proper flow across the entire area of the well.

3.7 CLEANING

A. The Controls Contractor shall clean up all debris resulting from his or her activities daily. The contractor shall remove all cartons, containers, crates, etc. under his (or his sub-contractors) control as soon as their contents have been removed. Waste shall be collected and placed in a location designated by the Construction Manager or General Contractor.

B. At the completion of work in any area, the Controls Contractor shall clean all of his/her work,

equipment, etc., making it free from dirt and debris, etc.

C. At the completion of work, all equipment furnished under this Section shall be checked for paint damage, and any factory-finished paint that has been damaged shall be repaired to match the adjacent areas. Any metal cabinet or enclosure that has been deformed shall be replaced with new material and repainted to match the adjacent areas.

3.8 PROTECTION

A. The Controls Contractor shall protect all work and material from damage by his/her work or workers or sub-contractors, and shall be liable for all damage thus caused.

B. The Controls Contractor shall be responsible for his/her work and equipment until finally inspected, tested, and accepted. The Controls Contractor shall protect his/her work against theft or damage, and shall carefully store material and equipment received on-site that is not immediately installed. The Controls Contractor shall close all open ends of work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.

3.9 CHECKOUT, START-UP AND TESTING

A. The FAS shall be properly commissioned prior to acceptance. The Controls Contractor shall coordinate with others (including mechanical, electrical and test and balance) to properly start up and verify the operation of the system. Provide as-built documentation as detailed in Part 1 of this Section.

3.10 ACCEPTANCE

A. The FAS will not be accepted as meeting the requirements of Completion until all tests described in this specification have been performed to the satisfaction of the Engineer and the Owner (or designated representative). Any tests that cannot be performed due to circumstances beyond the control of the Contractor may be exempt from the Completion requirements if stated as such in writing by the Owner or the Owner's representative. Such tests shall then be performed as part of the warranty.

3.11 SCHEDULE OF RESPONSIBILITIES

A. The following schedule identifies the responsible Division for the installation of the facility automation system. This schedule should be used as a general guide. The General Contractor is the central authority governing the total responsibility of all trade contractors. Therefore, deviations and clarifications of this schedule are permitted provided the General Contractor assumes responsibility to coordinate the trade contractors different than as indicated herein. If deviations or clarifications to this schedule are implemented, submit a record copy to the Architect.